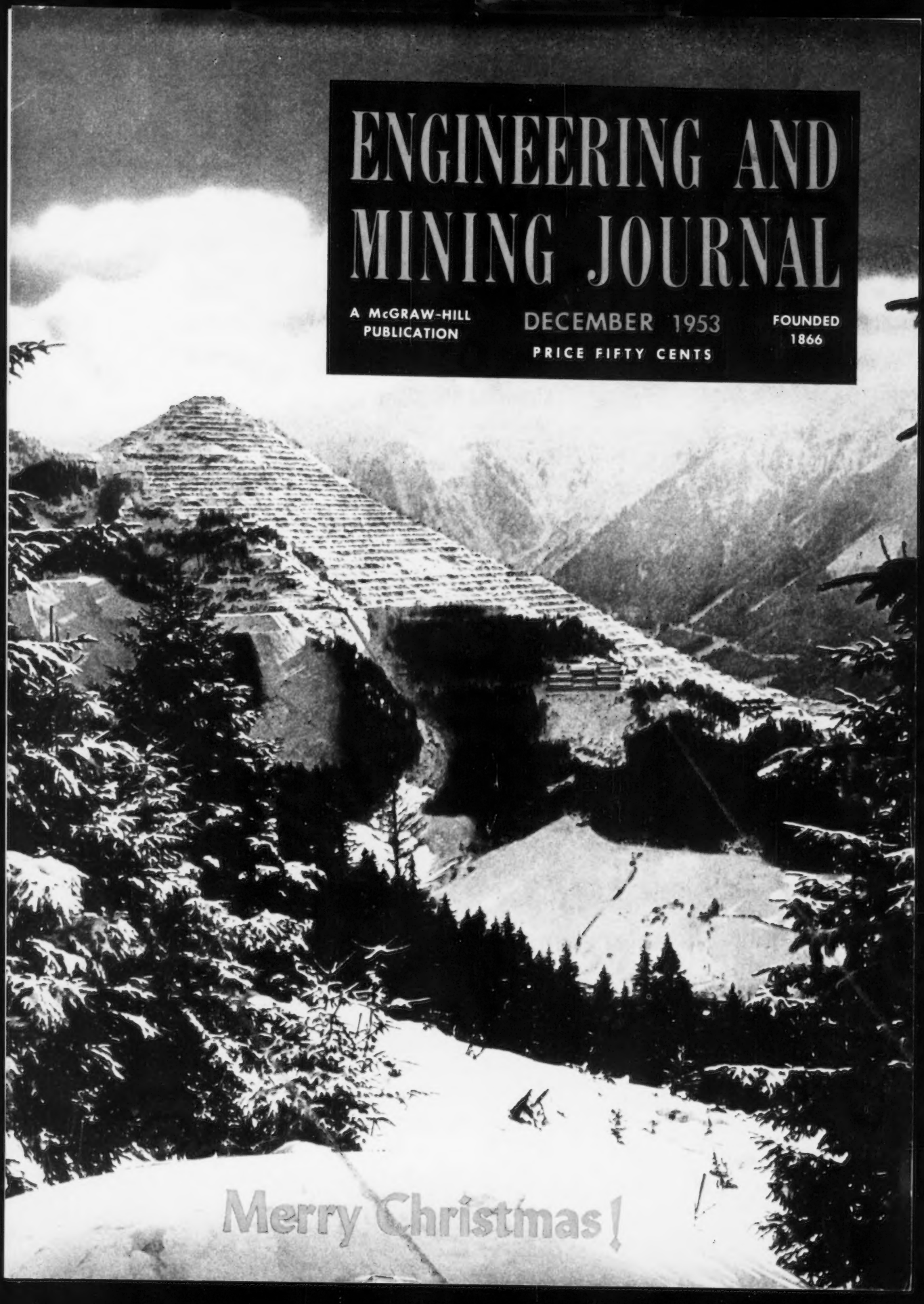
ENGINEERING AND MINING JOURNAL

A McGRAW-HILL PUBLICATION

DECEMBER 1953

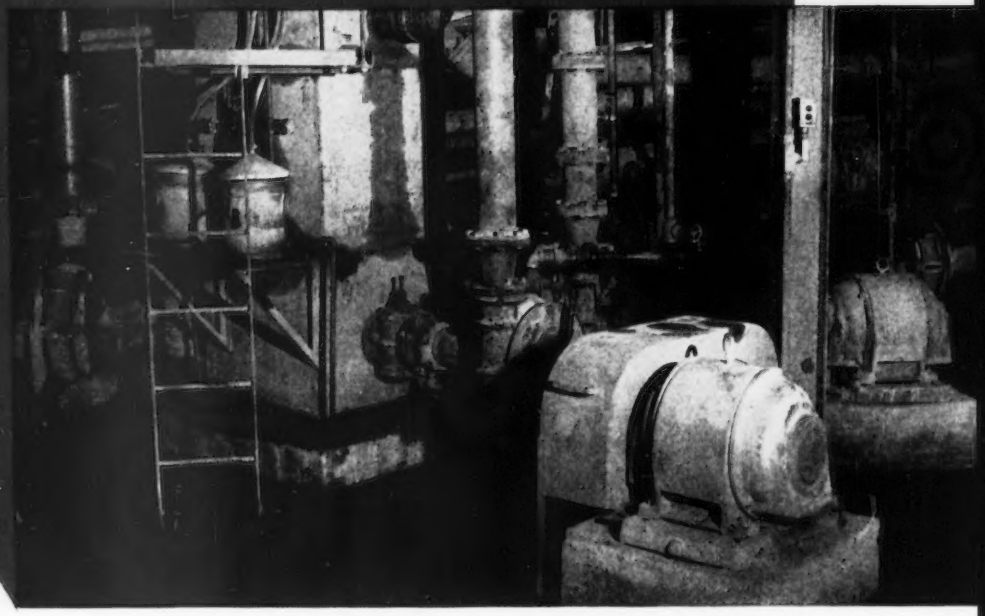
PRICE FIFTY CENTS

FOUNDED 1866

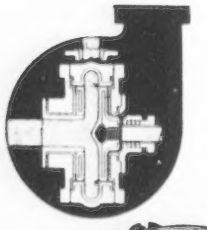


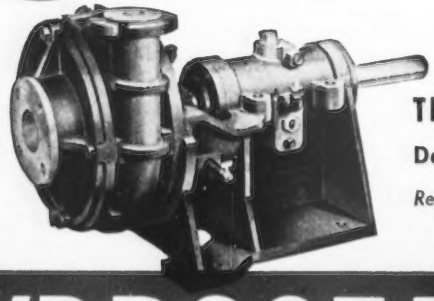
For pumping abrasives

The New Jersey Zinc Company approves HYDROSEALS



A cluster of three tailings Hydroseal Pumps and, in the right background, another Hydroseal moving slime at the Austinville, Va., mine, where 15 other Hydroseals are in use.





Besides the Hydroseal equipment at Austinville, two Hydroseals are working in series at the Empire Zinc mine in Hanover, New Mexico. Having experienced the efficiency and operating economy of these superior pumps, New Jersey Zinc has purchased Hydroseals for their new project at Friedensville, Pa. Hydroseals likely are the answer to your pumping problem, too.

Write for our new Catalog No. 953

THE ALLEN-SHERMAN-HOFF PUMP CO.

Dept. B—259 E. Lancaster Ave., Wynnewood, Pa.

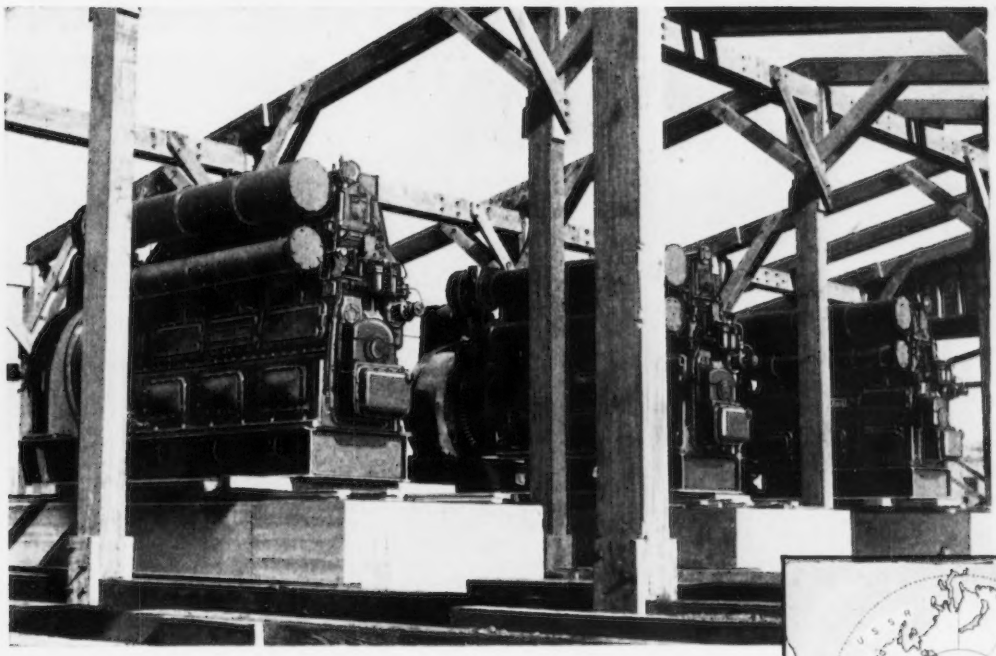
Representatives throughout the World

HYDROSEAL *and CENTRISEAL*

SAND, SLURRY & DREDGE PUMPS

MAXIMIX RUBBER PROTECTED

Sitting on top of the world



Over 30 Ingersoll-Rand Diesel Engines generate electric power for north polar air base . . .

Here at Thule – civilization's northernmost outpost, only 900 miles from the pole – the fierce arctic winter is 8 months long, with temperatures of 50 below zero and hurricane winds up to 150 miles an hour! At an isolated outpost like this, the traditional *dependability* of Ingersoll-Rand diesel engines is a tremendous asset.

The engines generate electric power for the new 480 acre American air base at Thule. Three of them are shown above during construction of one of the power plants.

The engines were shipped completely assembled. Their *compact design* and low weight-to-horsepower ratio simplified handling and installation under very difficult conditions. Low fuel consumption, too, is an important consideration for a diesel engine installation such as at Thule. It's also one of the reasons why I-R diesels are repeatedly selected when *economy of operation* and *heavy-duty service* must be combined.

Ask your nearest Ingersoll-Rand engineer to tell you about the many other important advantages of I-R heavy-duty 4-cycle diesels – built in sizes from 200 to 900 hp.

946-7

Ingersoll-Rand
11 BROADWAY, NEW YORK 4, N. Y.

Construction of the diesel power plants at Thule was an ingenious solution to one tough problem called "perma-frost", a condition in which the earth a few feet below the surface is frozen to rock-like hardness. Ordinary building foundations were ruled out. The diesel-generator units were bolted to thick concrete slabs resting on piles set into the frozen ground. Buildings were constructed around them with floors laid on timbers above the ground. The underfloor air space insulates the building from the earth – and heavy concrete weights anchor the structures against the strong winds.

COMPRESSORS • ROCK DRILLS • AIR TOOLS • TURBO BLOWERS • CONDENSERS • CENTRIFUGAL PUMPS • DIESEL AND GAS ENGINES

DECEMBER 1953

FEATURE ARTICLES

Editorial 71

Cobalt at Fredericktown .....G. P. Lutjen 72

What Price Lead 1953-1975? .....W. P. Shea 77

E&MJ Visits a General Superintendent..J. H. Kearney 83

The Great Pack Burro Race .....A. A. Richie 89

Corrugated Steel—The Handy Structural Member .... W. N. Johnson 90

First Shipments From Cerro Bolivar 92

Slag Fuming at Selby 95

Austria's Erzburg 125

Index for 1953 Volume Faces Page 174

REGULAR DEPARTMENTS

Outlook 67

Markets 68

Behind the By-Lines .. 70

Keeping Tab 98

New Products Digest .. 109

Operating Ideas 104

Washington Impact .. 101

Personal News 116

This Month in Mining.. 120

Alfred M. Staehle .....Publisher

Robert H. Ramsey .....Editor

Alvin W. Knoerr, Managing Editor

Hans H. Wanders, Market Editor

John H. Kearney, News Editor

A. H. Hubbell, Senior Associate Editor

George H. Cleaver, Assistant Editor, Markets

George J. Young, Consultant McGraw-Hill Washington Bureau

John B. Huttl, Associate Editor, San Francisco

F. Alvin Zimmerli, Assistant Editor, Layout

Morton A. Reichek, Natural Resources

George P. Lutjen, Associate Editor

Daniel P. Elgo, Copy Editor

Joseph M. Gambatese, Labor

Carl Coash, Advertising Sales Manager

Published monthly by McGraw-Hill Publishing Co., Inc. James H. McGraw (1860-1948), Founder.

Publication Office, 1309 Noble St., Philadelphia 23, Pa. Executive, Editorial and Advertising Offices: McGraw-Hill Building, 330 West 42nd St., New York 36, N. Y. Donald C. McGraw, President; Willard Chevalier, Executive Vice President; Joseph A. Gerardi, Vice President and Treasurer; John J. Cooke, Secretary; Paul Montgomery, Senior Vice President, Publications Division; Ralph B. Smith, Vice President and Editorial Director; Nelson Bond, Vice President and Director of Advertising; J. E. Blackburn, Jr., Vice President and Director of Circulation.

Subscriptions: Address correspondence to Engineering and Mining Journal—Subscription Service, 1309 Noble St., Philadelphia 23, Pa., or 330 West 42nd St., New York 36, N.Y. Allow one month for change of address.

Subscriptions are solicited only from management, production and maintenance executives and engineers in the metal and nonmetallic mining and refining industry. Position and company connection must be indicated on subscription orders.

Branch Offices and District Managers: Atlanta 3, R. H. Sidur; Chicago 11, F. W. Roets, G. A. Mack; Cleveland 15, W. M. Spears; Dallas 1, J. H. Cash; Los Angeles 17, C. W. Dysinger; New York 36, T. E. Alcorn, John B. Lewis; Pittsburgh 22, H. C. Chellson; Philadelphia 3, W. A. Potter; St. Louis 8, F. W. Roets; San Francisco 4, J. W. Otterson; Washington 4, D. C. London address: McGraw-Hill Publishing Co., Ltd., McGraw-Hill House, 95 Farringdon Street, London E. C. 4, England. Cable address: McGraw-Hill, London.

News Bureaus: Atlanta 3; Cleveland 15; Detroit 26; Houston 25; San Francisco 4; Washington 4.

World News Offices: London, Frankfurt, Manila, Mexico City, Paris, Sao Paulo, Tokyo.

Price of this issue 50¢. Subscription rates: United States and possessions, $3 a year, $4 for 2 years, $5 for 3 years. Other Western Hemisphere, $5 a year, $8 for 2 years, $10 for 3 years. Elsewhere, $15 a year, $25 for 2 years, $30 for 3 years.

Please indicate position and company connection in all subscription orders.

Entered as second class matter May 24, 1951, at the Post Office at Philadelphia, Pa. under the Act of March 3, 1879.

Copyright 1953 by McGraw-Hill Publishing Co., Inc.—All Rights Reserved. Printed in U.S.A.

ENGINEERING AND MINING JOURNAL

87th YEAR OF PUBLICATION

VOLUME 154 NUMBER 12

A McGRAW-HILL PUBLICATION

Member of Associated Business Publications and Audit Bureau of Circulations

LETTERS TO THE EDITOR

Add "Regall"

SIR:

The word "regall" as used in the article, "How To Apply A Good Converter Lining" (see Operating Ideas, p. 104), refers to the contents of the converter in the condition between the white metal stage and finished copper, or during the "finish blow"—when slagging is completed.

I have found it used more generally when referring to the latter part of the finish blow.

FORREST E. WING
Tacoma, Wash.

Ed: Thanks, Mr. Wing, for one more addition to our mining glossary. We asked because we feared that some of our readers might also be unfamiliar with the term, used in the very specialized, and vital, field of converter lining.

USGS in Alaska

SIR:

I have read your (September 1953) issue of *E&MJ*, and note two small items under "Alaska" which merit comment:

The geochemical exploration techniques recently applied successfully by the Geological Survey at Cape Caamano (acting for the Field Team, Region I, DMEA) to locate favorable areas in advance of exploration trenches, are believed by the writer to represent the first attempt to apply these techniques in Alaska. It is gratifying that the first attempt was also an eminently successful one (though on a small scale), and it is hoped that other companies engaged in exploration of "blind" orebodies in Alaska will be encouraged to apply these same techniques.

Under the paragraph discussing the work being done by various companies at the Klukwan magnetite deposit you state "the government had worked

(*Continued on page 190*)

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER

One belt does the work of 3— hauls 900 tons an hour uphill

GETTING iron ore out of a deep pit like this used to call for a series of three or more conveyor belts. No one belt was strong enough, flexible enough to haul that far, that steep.

Then B. F. Goodrich developed steel cord construction. In this exclusive belt design, individual steel cords run lengthwise, each completely surrounded by rubber. These parallel cords give tremendous strength, yet are flexible so that troughing is natural, belt keeps centered on idlers, spillage is held to a minimum.

With steel cord construction, a single-flight conveyor now does the job of three or four belts on high lift, long distance installations. Money is saved, handling is faster because the steel cord belt eliminates the transfer point necessary with a conveyor system built in several stages with ordinary belts.

Extraordinary records made by the B. F. Goodrich belt on other "impossible" jobs convinced this mining company it would stand the strain on this one. The B. F. Goodrich steel cord belt was installed, and has been at work ever since—summer and winter—hauling 900 tons an hour up the steep incline.

If you need a conveyor belt that must take severe impact on loading, and haul heavy loads up steep inclines, let your local BFG distributor show you how a B. F. Goodrich steel cord belt can do the job more efficiently and at lower cost than a system built in several flights. Or send the coupon below for more information.

The B. F. Goodrich Company
Dept. M-216, Akron 18, Ohio

Without obligation, please send information on:

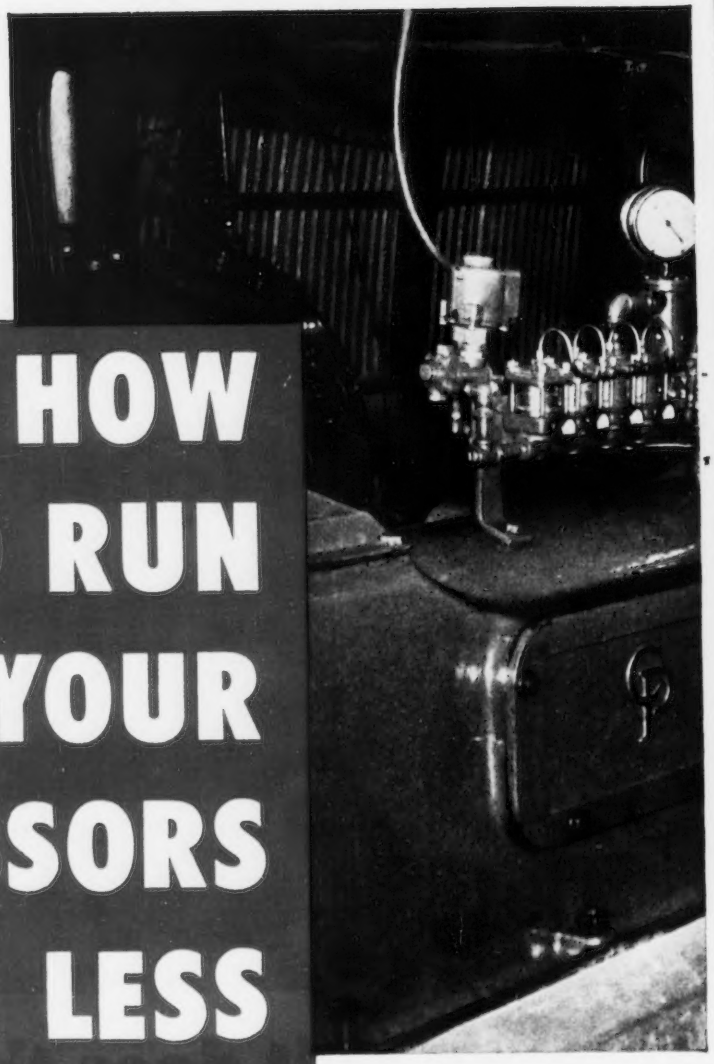
- ☐ steel cord belts
- ☐ other products (name type) _____
- ☐ Have a BFG distributor see me

Name _____

Company _____

Address _____

B.F.Goodrich
INDUSTRIAL PRODUCTS DIVISION

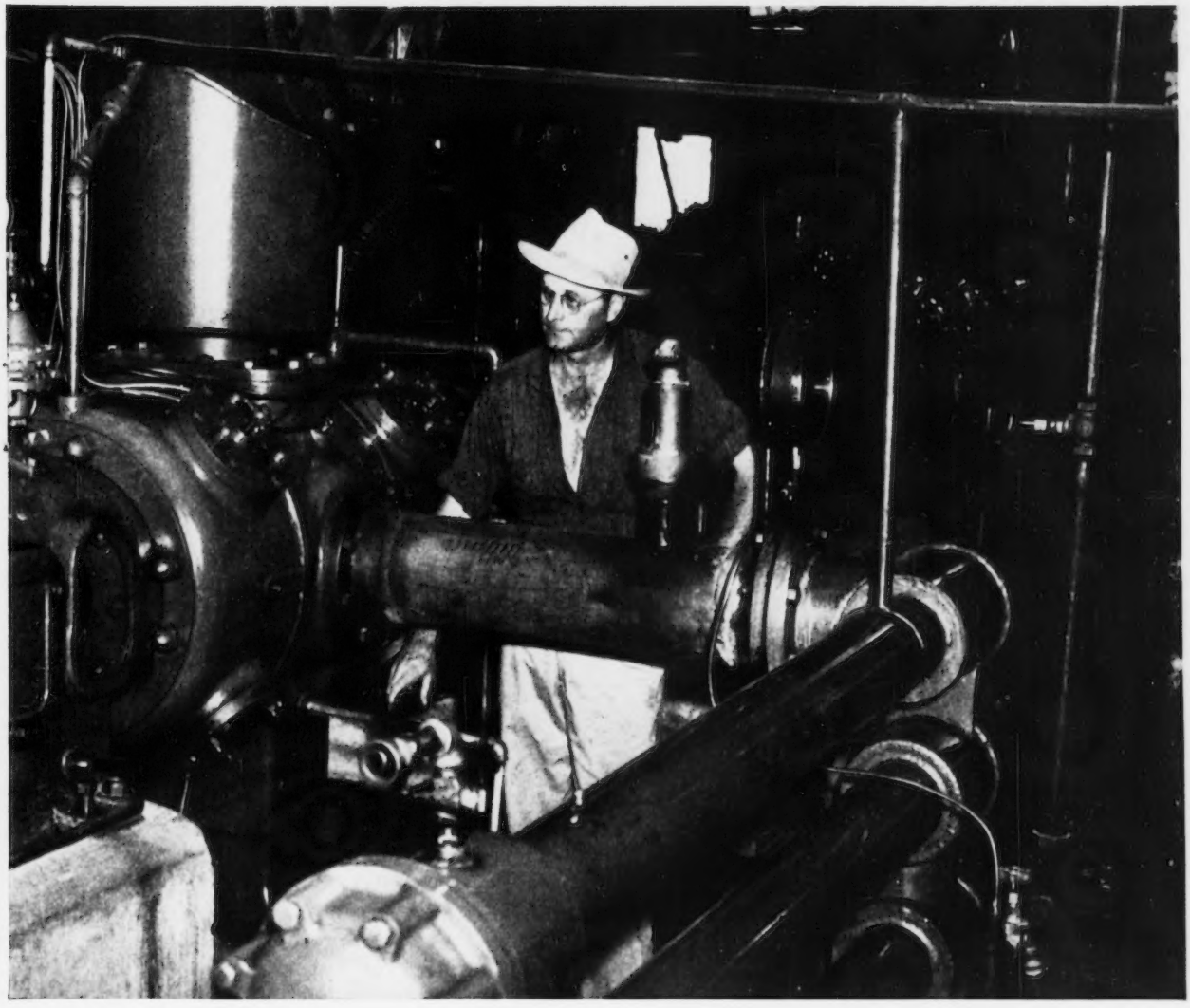


HOW TO RUN YOUR COMPRESSORS FOR LESS

FOR OVER 20 YEARS, MORE COPPER ORE HAS BEEN MINED IN THE U.S. WITH TEXACO-LUBRICATED EQUIPMENT THAN WITH ANY OTHER.

TUNE IN:
METROPOLITAN OPERA
radio broadcasts
every Saturday afternoon.
See newspaper for
time and station.

TEXACO



MAINTENANCE COSTS for air compressors drop, and efficiency goes up, when you lubricate with the oil that is *exactly right* for the type and size of your compressors and the operating conditions encountered. Use one of the complete line of Texaco air compressor oils.

Texaco provides this complete line of air compressor oils because *no one* oil can be just right for *all* conditions. When you come to Texaco you can be sure of getting the oil that will give you the best possible performance at the lowest possible operating cost. A Texaco Lubrication Engineer will gladly help you make the proper selection.

For your drills and other air tools, use *Texaco Rock Drill Lubricant EP.* This "extreme pressure" lubricant eliminates fogging, gives high protection against wear and prevents rust whether drills are running or idle.

Call in a Texaco Lubrication Engineer today. Just contact the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

☆ ☆ ☆

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

Lubricants and Fuels

FOR THE MINING INDUSTRY

pick up bigger payloads

with "KOEHRING WORK CAPACITY"

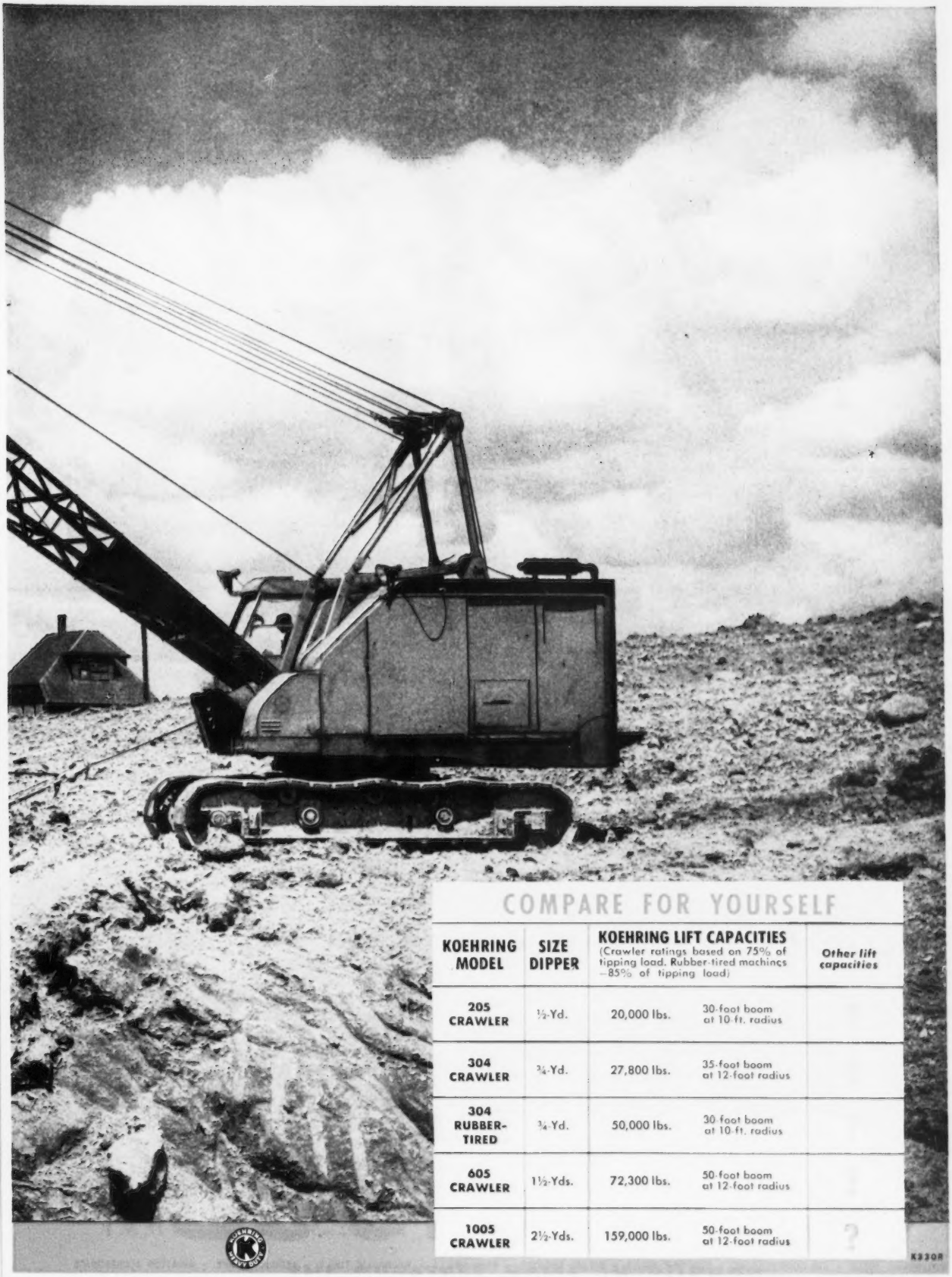
Big payload performance of Koehring cranes and excavators can be measured very quickly. Take a look at lifting capacities, for instance.

Obviously, the machine with the heaviest lift capacity not only picks up larger crane loads, it also has more power and stability to increase shovel or hoe production — handles bigger dragline and clamshell buckets on a wider work range.

Check lift ratings and other clear-cut measurements of "KOEHRING WORK CAPACITY", to insure biggest payload performance on all of your jobs. See Koehring distributor for all the facts.

KOEHRING COMPANY Milwaukee 16, Wis.

Subsidiaries: JOHNSON PARSONS • KWIK-MIX



COMPARE FOR YOURSELF

KOEHRING MODEL	SIZE DIPPER	KOEHRING LIFT CAPACITIES (Crawler ratings based on 75% of tipping load. Rubber-tired machines —85% of tipping load)		Other lift capacities
205 CRAWLER	½-Yd.	20,000 lbs.	30-foot boom at 10-ft. radius	
304 CRAWLER	¾-Yd.	27,800 lbs.	35-foot boom at 12-foot radius	
304 RUBBER-TIRED	¾-Yd.	50,000 lbs.	30-foot boom at 10-ft. radius	
605 CRAWLER	1½-Yds.	72,300 lbs.	50-foot boom at 12-foot radius	
1005 CRAWLER	2½-Yds.	159,000 lbs.	50-foot boom at 12-foot radius	?

K330R

faster by far...

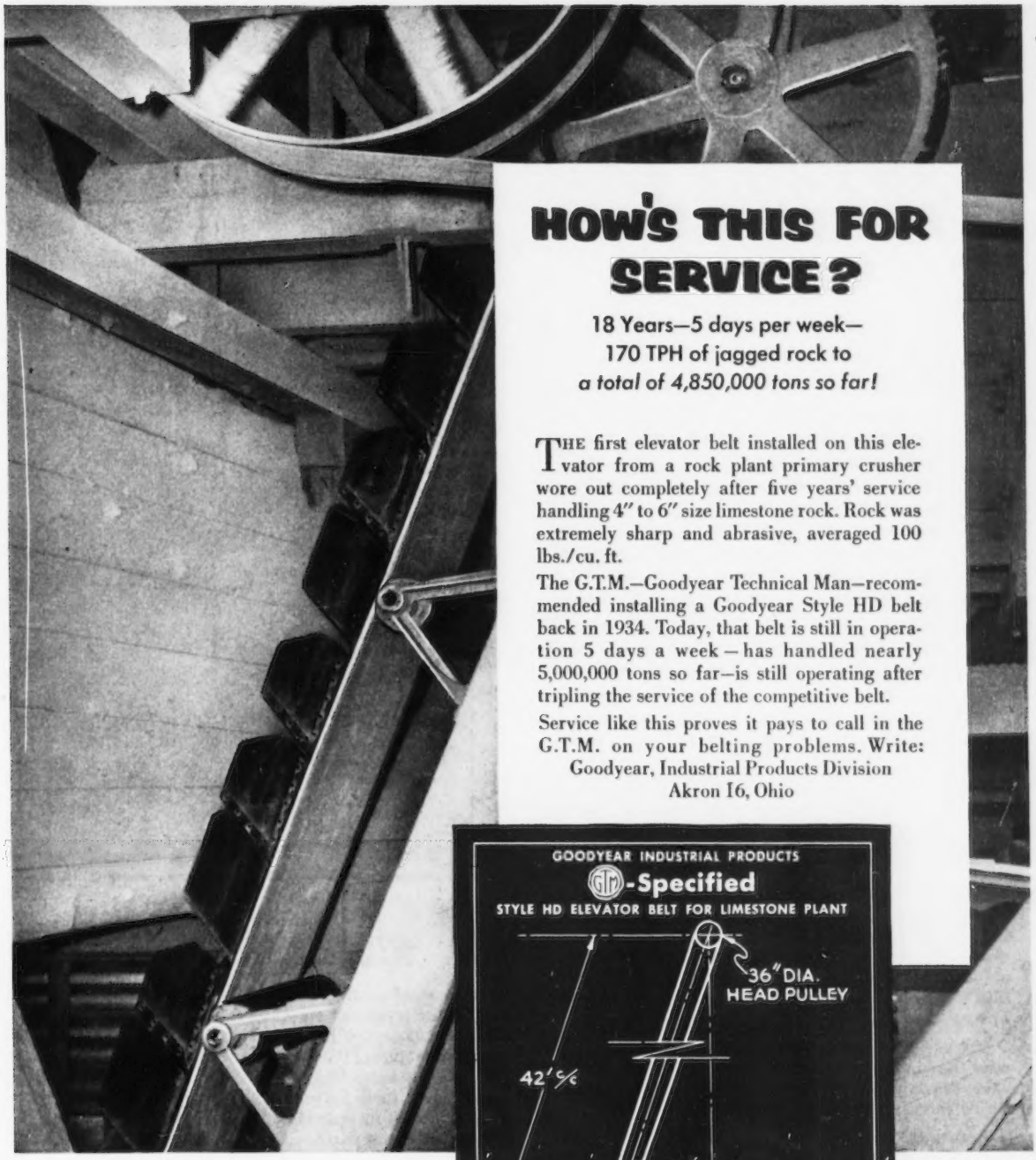
THAN ANY OTHER DIAMOND DRILL

Powerful, light-weight and easy-to-handle, the CP-55 Diamond Drill is faster than any other diamond drill in its class! With a highly efficient CP Rotary Air Motor, it requires only a minimum amount of air per foot drilled. It's a real time saver, too! Can be used for blast hole and exploratory drilling with equal efficiency.

This rugged, Chicago Pneumatic Diamond Drill has delicate bit control which keeps bit costs down and affords high core recovery. Has self-aligning rod puller for holes deeper than 100 feet. Conservatively rated at 500 feet with E Rods and EX Fittings. For more details, write for Bulletin 318. *Chicago Pneumatic Tool Company, 8 East 44th St., New York 17, N. Y.*

Chicago Pneumatic

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES • ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES



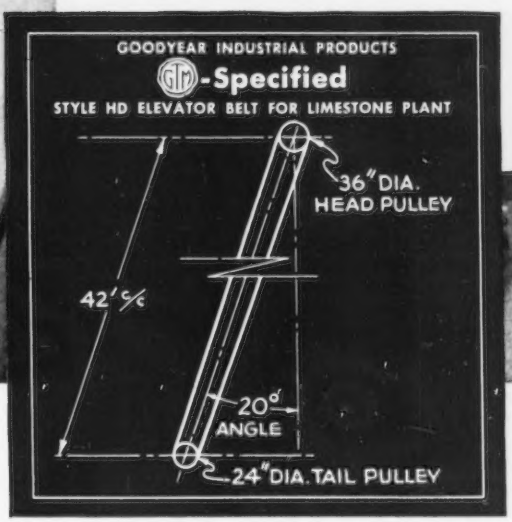
HOW'S THIS FOR SERVICE?

18 Years—5 days per week—
170 TPH of jagged rock to
a total of 4,850,000 tons so far!

THE first elevator belt installed on this elevator from a rock plant primary crusher wore out completely after five years' service handling 4″ to 6″ size limestone rock. Rock was extremely sharp and abrasive, averaged 100 lbs./cu. ft.

The G.T.M.—Goodyear Technical Man—recommended installing a Goodyear Style HD belt back in 1934. Today, that belt is still in operation 5 days a week—has handled nearly 5,000,000 tons so far—is still operating after tripling the service of the competitive belt.

Service like this proves it pays to call in the G.T.M. on your belting problems. Write: Goodyear, Industrial Products Division, Akron 16, Ohio



YOUR GOODYEAR DISTRIBUTOR *can quickly supply you with Hose, Flat Belts, V-Belts, Packing, Tank Lining, Rubber-Covered Rolls: Look for him in the yellow pages of your Telephone Directory under "Rubber Products" or "Rubber Goods."*

GOODYEAR

THE GREATEST NAME IN RUBBER

Holding Tight Since 1917 On Boiler Header Service

THE INSTALLATION

In power plant of a U. S. Government Arsenal, using Crane 14-inch 300-pound steel gate valves in main steam header operating at 135 pounds, 380 degrees F.

VALVE SERVICE RATINGS

SUITABILITY: No failure in 36 years

FEATURES: 100% heavy duty design

MAINTENANCE COST: No repairs to date

SERVICE LIFE: Installed 1917 – still O.K.

OPERATING RESULT: Increased plant efficiency

AVAILABILITY: Crane catalog item – Current No. 33XR

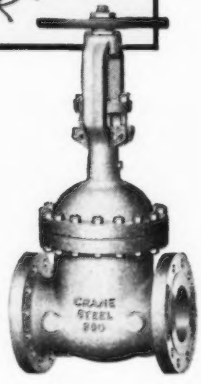
THE CASE HISTORY

Installed in 1917, these Crane valves have given completely satisfactory service for 36 years without needing repairs of any kind. Inspected in 1951, they showed no undue wear in any part, and a 125-pound hydrostatic test found them absolutely tight. Right back into the header they went, where they're still giving like-new service.

In a period of plant expansion, other makes of valves were tried in the same header service. But those valves gave constant trouble, whereas when replaced with Crane valves, satisfactory results were obtained.

Here's an example of the confidence you can put in a name that traditionally means better quality. For what good is a price without the assurance of product dependability and good value. You're safer—always—when you choose Crane.

THE VALVE



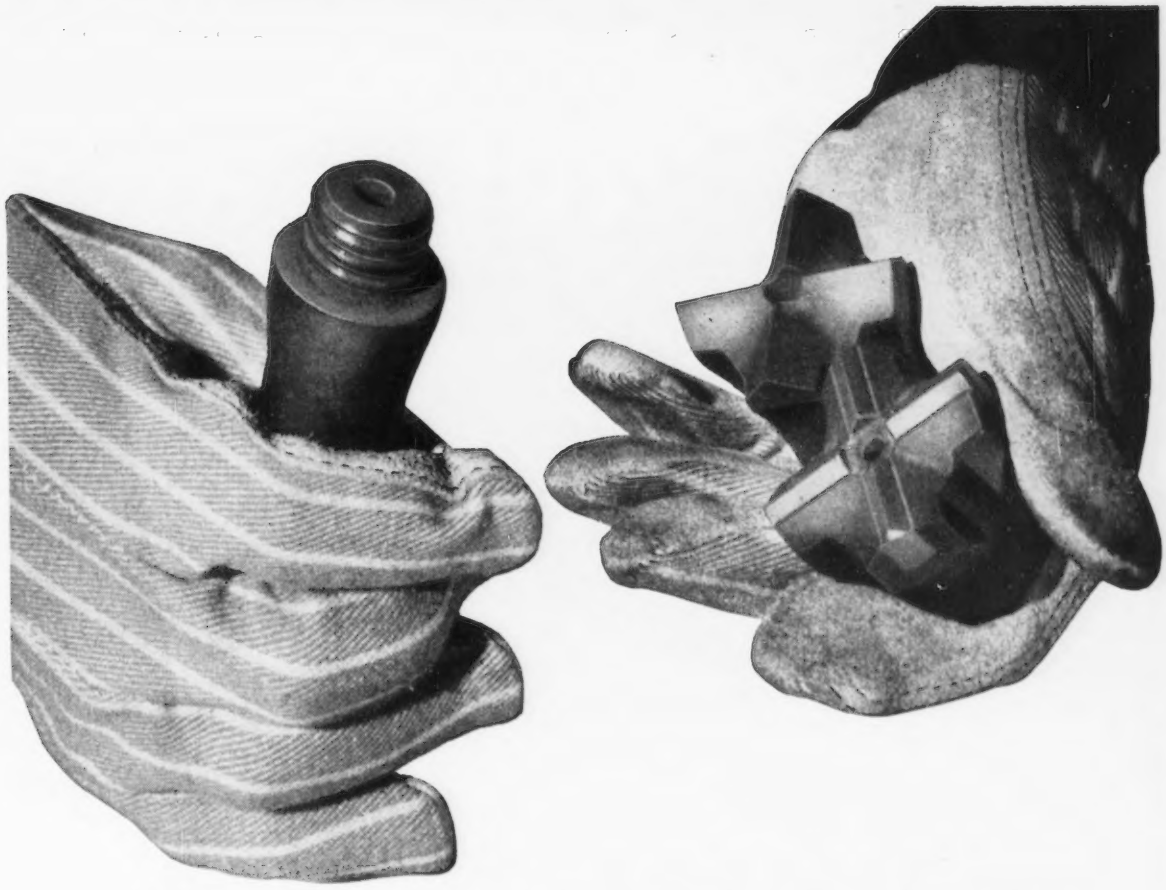
Here is steel casting skill at its best, by the pioneer in steel valves. Here also is leadership in design and manufacturing that sets Crane Steel Valves apart from the ordinary. Choose these valves for your specific needs from the widest range of body and trim materials, in all pressure classes and sizes, with flanged, screwed, or welding ends. See your Crane Catalog.

THE BETTER QUALITY... BIGGER VALUE LINE... IN BRASS, STEEL, IRON

CRANE VALVES

CRANE CO., *General Offices:* 836 S. Michigan Ave., Chicago 5, Illinois
Branches and Wholesalers Serving All Industrial Areas

VALVES • FITTINGS • PIPE • PLUMBING • HEATING



Save drilling time! You can change TIMKEN® rock bit types in one minute flat

Dozens of different Timken® carbide insert and multi-use bits fit the same drill steel

With Timken® interchangeable rock bits, it only takes a minute to unscrew one rock bit and screw on a different type bit right on the job—whenever the ground changes. Because dozens of different Timken carbide insert and multi-use bits fit the same steel, your men don't waste drilling time by going after a different set of drill steels every time a different type bit is needed.

You can cut your drill steel inventory. And you can save even more money because your drillers always can use the most economical bit for the job.

Both Timken carbide insert and multi-use bits give you two additional advantages: 1) they're made from electric furnace Timken fine alloy steel, 2) they have a special shoulder union pioneered by Timken that keeps the drilling impact from damaging threads.

Our rock bit engineers may be able to help you with your drilling problems. They're experts at cutting drilling costs. Why not let them analyze your operations. There's no obligation. Just write to: The Timken Roller Bearing Company, Rock Bit Division, Canton 6, Ohio. Cable address: "TIMROSCO".

WHERE YOU CUT COSTS WITH TIMKEN MULTI-USE BITS

Most economical for ordinary ground. With correct and controlled reconditioning, they give lowest cost per foot of hole when full increments of steel can be drilled.

WHERE YOU CUT COSTS WITH TIMKEN CARBIDE INSERT BITS

Give highest speed through hard, abrasive ground. Also most economical for constant-gage holes, small diameter holes, very deep holes.

. . . your best bet for the best bit . . . for every job

TIMKEN

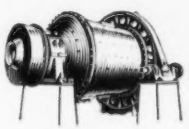
TRADE-MARK REG. U. S. PAT. OFF.

Allis-Chalmers know-how and equipment have been playing a leading role in the processing of taconite. A-C research laboratory tests, along with pilot plant operations and field work, have revealed valuable data on the processing of low grade iron ore. Crushers, vibrating screens and grinding mills furnished by Allis-Chalmers are already helping to solve the problem of taconite processing on the Mesabi range.

This *unsurpassed* background and experience on taconite, as well as A-C's many years of successful accomplishments on other ores, is available to you when you call an Allis-Chalmers representative. Phone the A-C man nearest you today, or write Allis-Chalmers, Milwaukee 1, Wisconsin.

A-3997

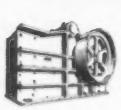
ALLIS-CHALMERS



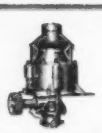
Grinding Mills

Sales Offices in Principal Cities in the U. S. A. Distributors Throughout the World.

Vibrating Screens



Jaw Crushers



Gyratory Crushers

Hammermills

Kilns, Coolers, Dryers

Proof that mining men find it profitable to specify Allis-Chalmers grinding mills is seen in the fact that 7 *out of* 10 A-C mills sold today are *re*peat orders!

Another NORTHWEST in COPPER!

HERE is another Northwest in one of the many copper operations in North America. This is the pit of Granby Consolidated Mining, Smelting Power Co., Ltd. at Copper Mountain, B. C., Canada.

The Northwest is loading out copper ore and proving the value of such Northwest advantages as Northwest Positive Traction, the "Feather-Touch" Clutch Control, the Northwest Cushion Clutch, Northwest Dual Independent Crowd and Northwest Simplicity of Design that makes upkeep easy and reduces "down time". These things are proving out in mining and hard rock work.

If you are planning modernization, expansion or additions in your pit you will find that Northwest advantages will speed up your output and cut your pit costs. Why not plan now for a fully Northwest equipped pit? We'd like to tell you more about Northwest Advantages and what Northwests are doing for other mining properties.

NORTHWEST ENGINEERING COMPANY

1509 Field Building

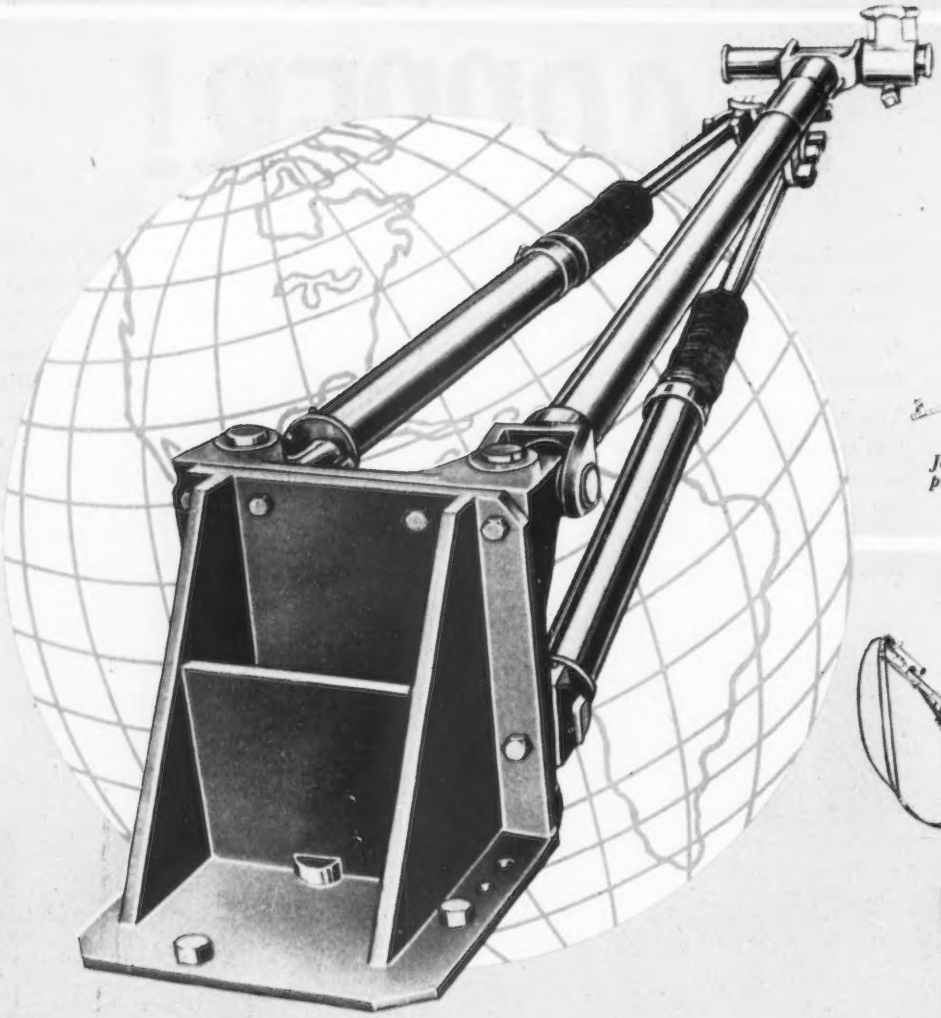
135 South LaSalle Street

Chicago 3, Illinois

NORTHWEST

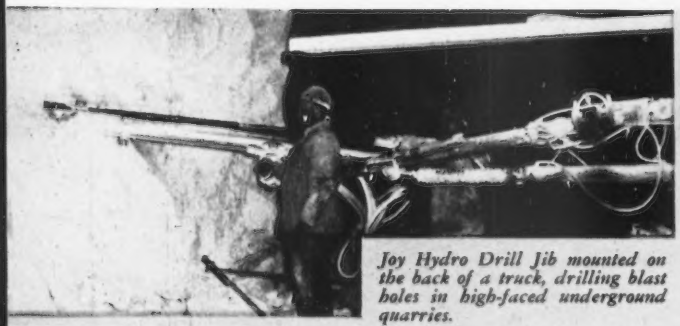
CRAWLER and TRUCK MOUNTED SHOVELS • CRANES • DRAGLINES • PULLSHOVELS

The World's Most

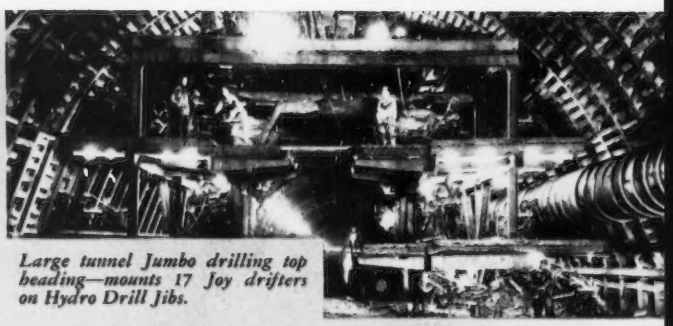


Joy DM-2 Drillmobile, a self-propelled, rubber-tired unit.

Joy DM-10 Drillmobile designed for drilling in high-face open pit quarries.



Joy Hydro Drill Jib mounted on the back of a truck, drilling blast holes in high-faced underground quarries.



Large tunnel Jumbo drilling top heading—mounts 17 Joy drifters on Hydro Drill Jibs.

Special wide-frame Joy Drillmobile drilling down holes on a dam construction job.

Joy Hydrojib Pipeline Drilling Rig with two Hydro Drill Jibs and built-in air compressor.

Versatile Drill Mounting...

JOY HYDRO DRILL JIBS

Here's the drill mounting that puts your drill just where you want it—easily and quickly. Field-proved for more than ten years under practically every mining and tunneling condition, the Hydro Drill Jib is now recognized as the standard for mechanizing drilling practices.

Look at these other proved advantages which make the Hydro Drill Jib outstanding in the field:

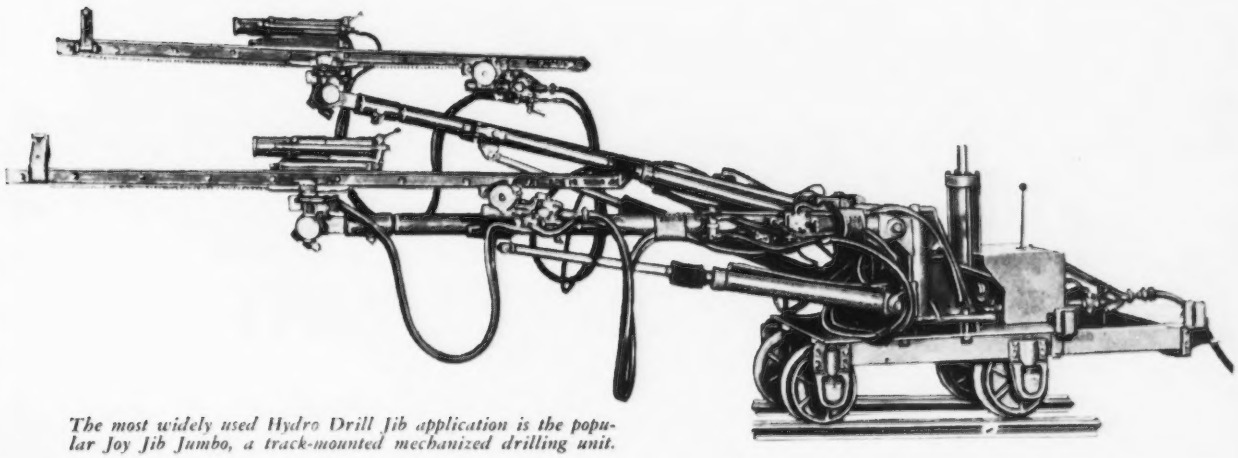
- More accurate hole spacing
- Fewer steel changes with long chain feeds
- Greater flexibility

The versatility of the Hydro Drill Jib is illustrated in the variety of mountings shown here.

One of these may be the one you need for your special drilling problems.

If you don't see the answer here, Joy can supply it with some other adaptation of the versatile Hydro Drill Jib.

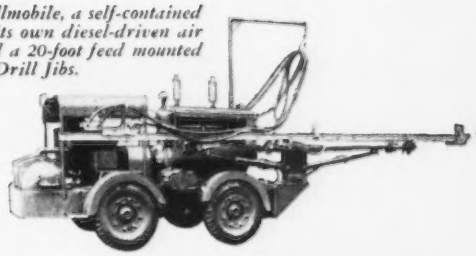
Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa. In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

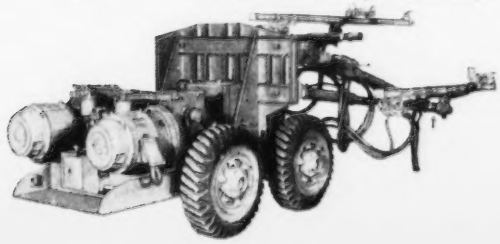


The most widely used Hydro Drill Jib application is the popular Joy Jib Jumbo, a track-mounted mechanized drilling unit.

Joy DM-8 Drillmobile, a self-propelled unit developed for mine roof bolting.

Joy DM-4 Drillmobile, a self-contained unit carrying its own diesel-driven air compressor and a 20-foot feed mounted on two Hydro Drill Jibs.





Special Joy Drillmobile with electric motor drive for tramming.

Consult a Joy Engineer

JOY

W&D M-4039

WORLD'S LARGEST MANUFACTURER OF UNDERGROUND MINING EQUIPMENT

Western DUMP CARS CAN CUT YOUR COSTS 3 WAYS

Western ***dump cars can save you money three ways:***

1. **FASTER AND EASIER** dumping and righting, because of their speedy action and dual side pivots, enable Westerns to cut operating costs by making those extra trips every day.

2. **EXTRA PAYLOAD** on every trip is the result of Westerns' design and the fact that they are of light but strong alloy steel. Deadweight is reduced to an absolute minimum.

3. **LESS MAINTENANCE, LONGER LIFE** are the inevitable result of their being designed and built so ruggedly . . . bed underframe is welded into a single strong unit . . . sturdy mechanism is always dependable . . . double plate doors are reinforced for unusual strength where needed most.

In 1952, according to Railway Age statistics, nine out of every ten dump cars bought were Westerns . . . thus more and more companies are cutting their haulage costs by replacing obsolete dump cars with modern Westerns. For further facts, write Manager, Car Dept. 6808, Baldwin-Lima-Hamilton Corp., Philadelphia 42, Pa.

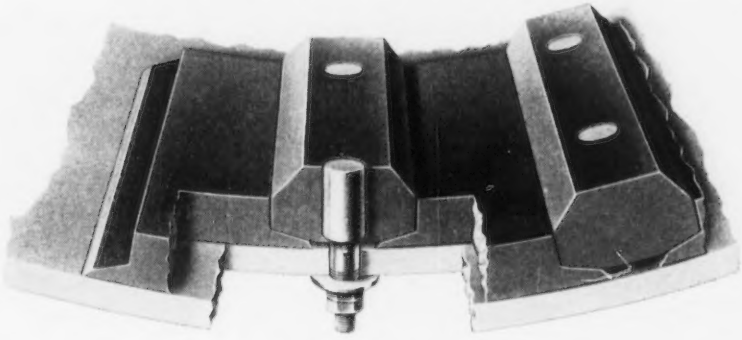
Western ***. . . Built by the world's largest manufacturer of dump cars***

BALDWIN - LIMA - HAMILTON

Philadelphia 42, Pa. • Offices in Principal Cities

You can cut costs

in your grinding operation with U·S·S Lorain Rolled Plate Linings



- Linings are in easy-to-handle sections, accurate sizes to permit quicker installation
- Plates can be heat-treated to compensate for localized wear
- Correct sizes make tighter joints . . . eliminate shell wash
- Lift bars are designed for correct cascade action . . . height of lift varied according to conditions
- Bolt supports located near the bottom of the bar . . . last for life of the lining

● You can do more and better grinding, for less money, with U·S·S Lorain Rolled Plate Linings. The output of your mill increases when the usable diameter increases, and this is just what happens when rugged Lorain *rolled steel* plates are used instead of ordinary castings. Lorain Liners can be much thinner due to their superior strength. Their lighter weight simplifies handling.

You save money with U·S·S Lorain Rolled Plate Linings because they are readily installed and require less maintenance. The plates are accurately made and are in easy-to-handle sections for ready use. Severe localized wear at feed or discharge end of the mill can be balanced by heat-treating. Lorain Liners are so durable that they remain serviceable until they're almost paper thin. You benefit from the use of the entire plate . . . there is less waste, longer wear. Mill down-time will be reduced and so will your upkeep costs.

The accurate size of U·S·S Lorain Rolled Plate Linings assures tight fit between the ends of the plates and between plates and lift bars, eliminating shell wash.

U·S·S Lorain Rolled Plate Linings are available—in the diameter, length and thickness best suited to your operating conditions—through leading mill manufacturers whose names will be furnished upon request.

U·S·S GRINDING BALLS are carefully made of special composition steel to take long, rough wear evenly. Samples from each production lot are thoroughly tested to make sure of surface hardness and maximum hardness penetration. They come in eleven sizes from $\frac{3}{4}$" to 5". For further information just return the coupon below.

United States Steel Corporation
Room 2819-T, 525 William Penn Place
Pittsburgh 30, Pa.

Without obligation on my part, please send me your FREE booklet on U·S·S Grinding Balls.

Name .....

Company .....

Address .....

City ..... State .....

UNITED STATES STEEL CORPORATION, PITTSBURGH · COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA. · UNITED STATES STEEL EXPORT COMPANY, NEW YORK

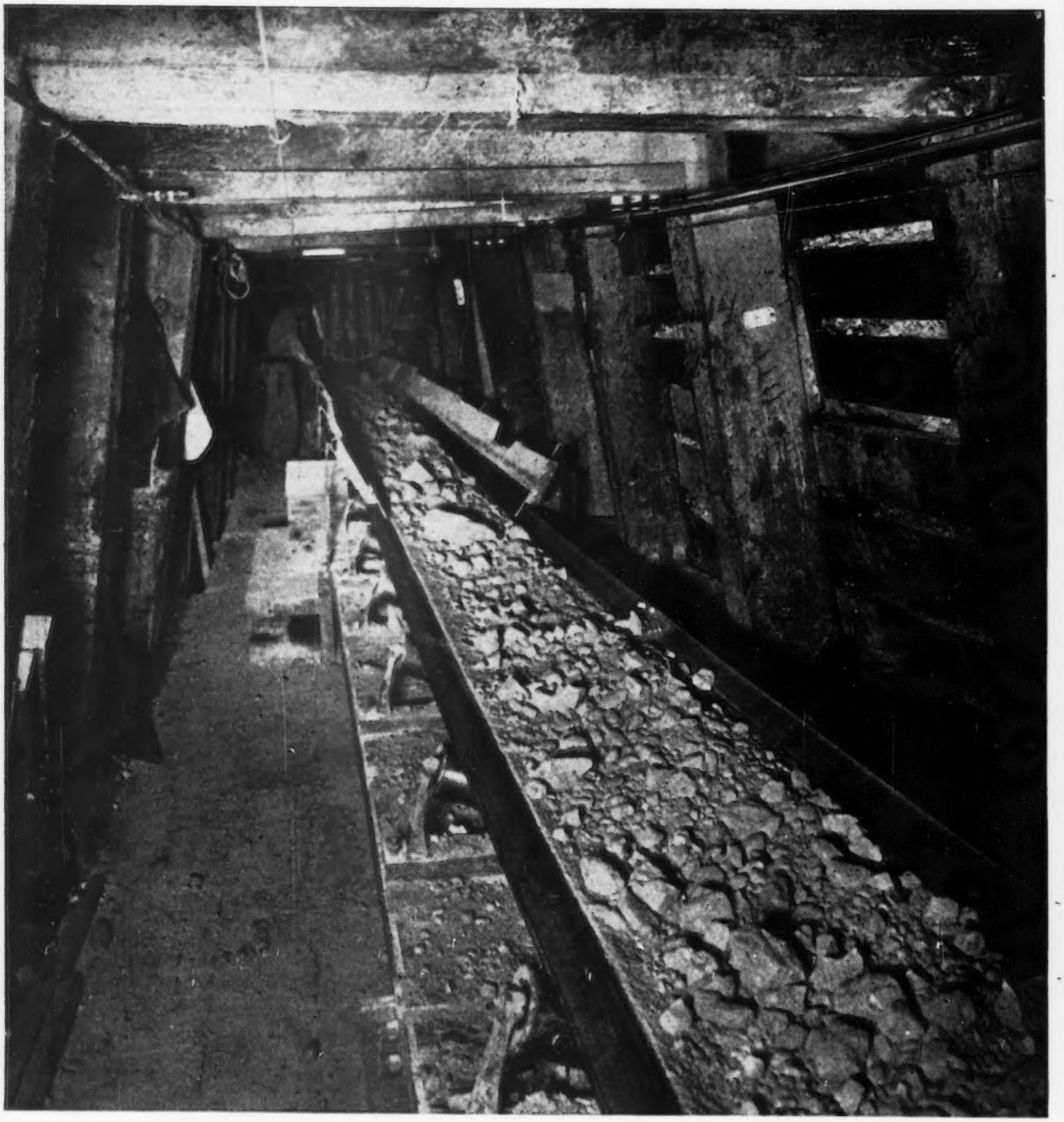
U·S·S LORAIN ROLLED PLATE LININGS AND U·S·S GRINDING BALLS

USS TRADE MARK

3-2023

UNITED STATES STEEL

A Complete Line of Belt



HEWITT-ROBINS INCORPORATED

HEWITT-ROBINS

EXECUTIVE OFFICES, STAMFORD, CONNECTICUT

Conveyors to Handle Ore

Whenever you handle ore in bulk—underground, overland, in open pit or mill—Hewitt-Robins belt conveyor systems will provide the most efficient, most economical answer.

Hewitt-Robins designs and manufactures a complete line of belt conveyor systems . . . Sectionalized Ore Mine —Mine-Type Shuttle—Engineered . . . each one matched to the requirements of a particular type of ore handling operation.

All Hewitt-Robins belt conveyor systems are backed by unified responsibility. Because Hewitt-Robins is the only company that designs and manufactures *both* the belting *and* specialized machinery, and assumes full responsibility for successful operation from drafting board to installation.

ENGINEERING DATA

FOR BLOCK CAVING: Hewitt-Robins sectionalized ore mine conveyors maintain a steady flow of ore in haulage drift or sub-drift under grizzly level . . . eliminate down time for timber repairs and replacement . . . assure less chance of breaking in stopes or arching in the chutes . . . provide faster withdrawal of block being mined.

FOR UNDERGROUND HAULAGE: Hewitt-Robins sectionalized ore mine conveyors and mine-type shuttle conveyors provide continuous transportation from working face to points of beneficiation. The mine-type shuttle conveyor answers the problem of truly continuous mining . . . it follows the working face and at the same time maintains a fixed transfer point through a fixed tripper—unit is extendable or retractable up to 600' . . . Sectionalized ore mine conveyors for main and stope haulage are available in 8' and 12' sections suitable for 3' and 4' idler spacing with choice of 24", 26", 30", 36", 42" and 48" belt widths.

FOR OVERLAND, OPEN PIT AND MILL HAULAGE: Hewitt-Robins engineered conveyors are designed to meet particular local conditions. They are available in belt widths from 16" up to 72" . . . are supplied with anti-friction, offset demountable-type idlers with 2½" diam. idler rolls (where minimum vertical clearance is available) up to 7" diam. rolls (where conditions require).

CHECK FOR INFORMATION ABOUT THESE JOB-TESTED PRODUCTS FOR YOUR OPERATION

CONVEYORS:

- ☐ —Belt
- ☐ —Dock
- ☐ —Ore Mine
- ☐ —Shuttle
- ☐ —Slope
- ☐ —Vibrating
- ☐ —Fixed Tripper Shuttle

BELTING:

- *☐ —Elevator
- *☐ —General
- *☐ —Hot Materials
- *☐ —Raynile®
- *☐ —Steel Wrapper
- *☐ —Transmission
- ☐ —Woven Wire
- ☐ BUCKET ELEVATORS
- ☐ IDLERS

SCREEN CLOTH:

- ☐ —Electrically Heated
- ☐ —General

VIBRATING SCREENS:

- ☐ —Dewaterizers
- ☐ —General
- ☐ —Heavy-Duty Scalpers
- ☐ —Heavy Media

HOSE:

- *☐ —Acid
- *☐ —Air
- *☐ —Air Drill
- *☐ —Fire
- *☐ —Servall®
- *☐ —Steam
- *☐ —Pinch Valve
- *☐ —Twin-Weld®
- *☐ —Water
- *☐ —Water Suction
- *☐ —Flexible Rubber Pipe

- ☐ MECHANICAL FEEDERS
- ☐ STACKERS
- ☐ CAR SHAKEOUTS
- ☐ TRIPPERS
- ☐ BELT CLEANERS
- *☐ GROOVED PULLEY LAGGING
- ☐ RUBBERLOKT® BRUSHES
- ☐ MOLDED RUBBER GOODS
- ☐ DESIGN AND CONSTRUCTION OF COMPLETE MATERIALS HANDLING SYSTEMS

*For immediate information about these industrial rubber products, call your Hewitt Rubber Distributor (See "Rubber Products," Classified Phone Book.)

Hewitt-Robins Incorporated
666 Glenbrook Road
Stamford, Connecticut

NAME

TITLE & COMPANY

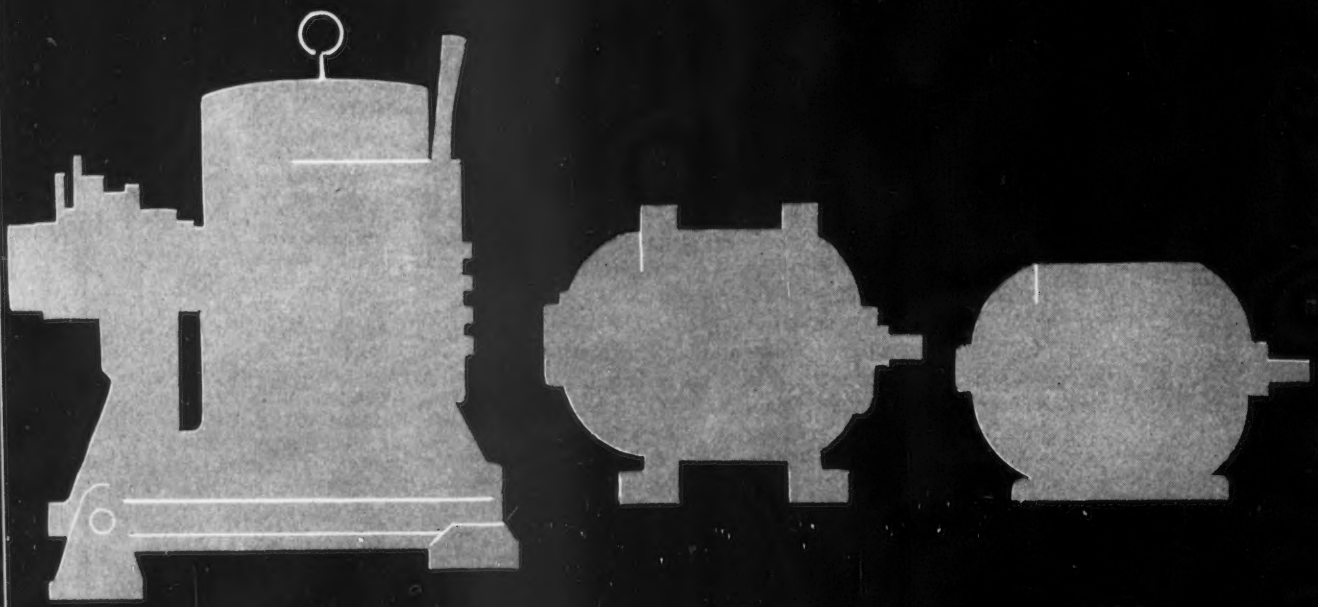
STREET ADDRESS

CITY PO ZONE STATE 1444

INCORPORATED

DOMESTIC DIVISIONS: Hewitt Rubber • Robins Conveyors • Robins Engineers • Restfoam
FOREIGN SUBSIDIARIES: Hewitt-Robins (Canada) Ltd., Montreal • Hewitt-Robins Internationale, Paris, France • Robins Conveyors (S. A.) Ltd., Johannesburg • **EXPORT DEPARTMENT:** New York City

WHAT'S NEW IN MOTORS



1888
TESLA
5 H.P.
765 LBS.

1926
CS
5 H.P.
130 LBS.

1947
LIFE-LINE
5 H.P.
119 LBS.

IS STILL TO COME . . .

Hear anything about a new motor? Well, if you think you have, let's set the record straight . . . What's New In Motors Is Still To Come!

Westinghouse has been a leader in the designing and manufacturing of motors for over 60 years. During these many years, over 20 million dollars has been spent on the development of basic lines of induction motors to maintain this leadership. Here are the real years of "new motors" in the parade of progress:

1888—*THE FIRST A-C MOTOR—THE WESTINGHOUSE TESLA MOTOR*

1926—*THE FIRST SEALED SLEEVE BEARINGS—THE WESTINGHOUSE CS MOTOR*

1947—*THE FIRST MOTOR WITH PRE-LUBRICATED BEARINGS PLUS A ⅓ WEIGHT AND SIZE REDUCTION—THE WESTINGHOUSE LIFE-LINE MOTOR*

The smaller, lighter Westinghouse Life-Line Motor of 1947 was the last major contribution. *AND FOR THE NEXT ALL-IMPORTANT STEP AHEAD IN MOTOR PROGRESS . . . LOOK TO WESTINGHOUSE.*

YOU CAN BE SURE.. IF IT'S Westinghouse

J-21834

MAKE WATER RUN UPHILL with ANHYDREX CABLES

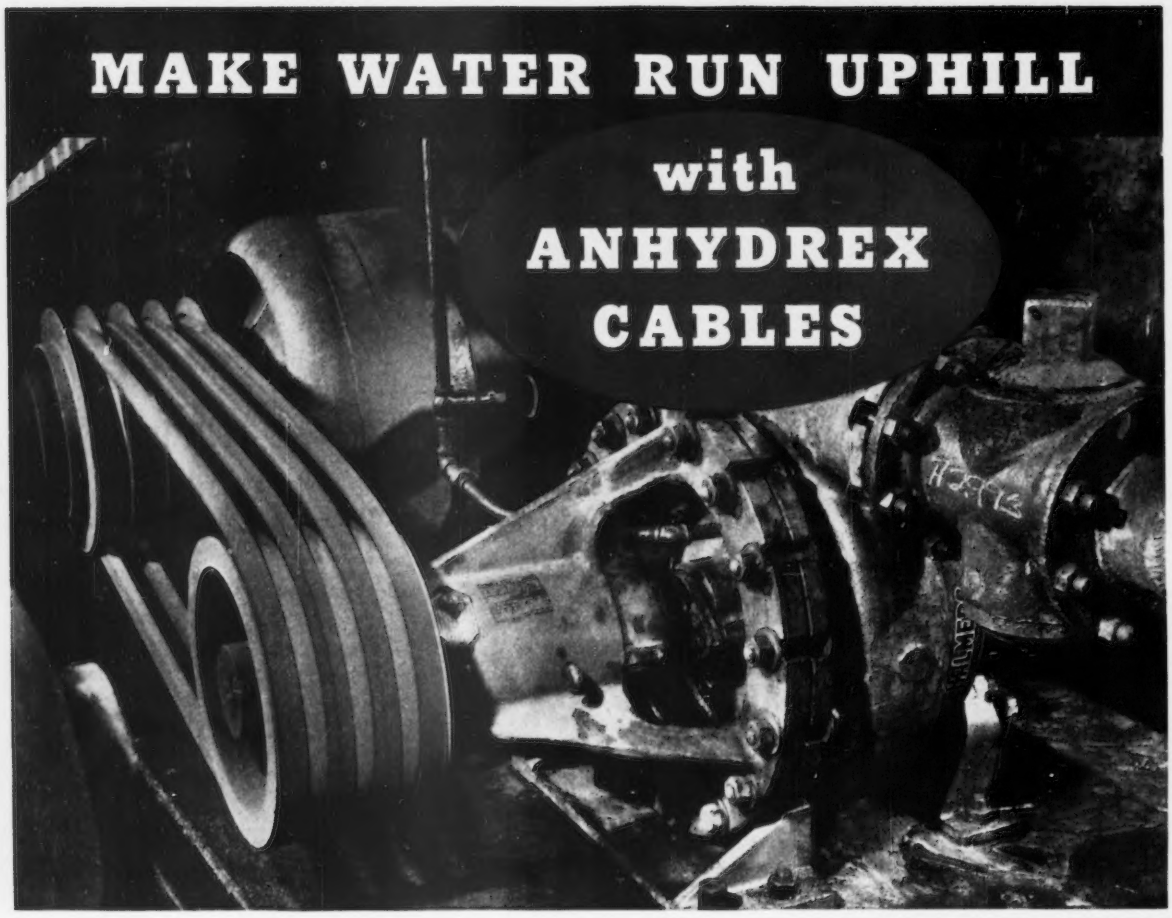


Photo courtesy ALLIS CHALMERS MFG. CO.

Getting rid of unwanted mine water is not something that can be put off until tomorrow. Frequently it must be done today — or else.

Continuous operations, such as pumping, should not be left to haphazard selection of "just any kind of cable." For service as important as this, only the highest grade cable should be installed. Penny-pinching is definitely not economy. All it does is increase your cost of operation.

Ask yourself how much it would cost if a cable failed and put a pump out of operation. When you think that way it should be obvious that ANHYDREX is the cable you should buy and install.

The conductors of Simplex-ANHYDREX Cables are insulated with a low water-absorptive rubber insulation. They are protected by a generous wall of a special neoprene jacket. That is a combination that can't be beat.

The next time you need a cable for pumping service, regardless of the difficulties involved, install a Simplex-ANHYDREX Cable. It will pay you large dividends in peace of mind and in long-time operation.

Simplex WIRES & CABLES

SIMPLEX WIRE & CABLE CO., 79 Sidney Street, Cambridge 39, Massachusetts

Here's the secret of alternate ROCKMASTER® teamed with alternate velocity loading

Alternate Velocity Loading is a newly introduced ROCKMASTER development which has produced astounding improvements in breakage and holds great promise for better blasting in mining, quarrying and construction work.

Every other hole is loaded with low velocity explosives. The balance are loaded with high velocity explosives. The faster ROCKMASTER millisecond delay caps fire the low velocity holes to stress the rock and the next delay interval releases the sharp second punch of the high velocity explosive.

The results of alternate velocity action can be seen in the photo above. The number one holes (which appear larger and lighter colored) were loaded with low velocity Apex and fired with No. 1 ROCKMASTER caps. The number two holes (which appear smaller and darker) were loaded with high velocity Apex and fired with No. 2 ROCKMASTERS.

All holes were initiated from the bottom to prolong confinement of the blast—giving maximum results of the alternate velocity loading.

At present Alternate Velocity Loading is being used only in quarry blasting, but it holds possibilities in many other fields. Talk with your Atlas representative about it. And send for your copy of the new Atlas periodical "Better Blasting" which details *the inside story* of Alternate Velocity Loading.

Absolutely no secondary breaking was necessary on this Alternate Velocity Shot. No. 1 holes show that explosive has worked longer on the burden than the high velocity explosive in the No. 2 holes.

ATLAS

ATLAS EXPLOSIVES

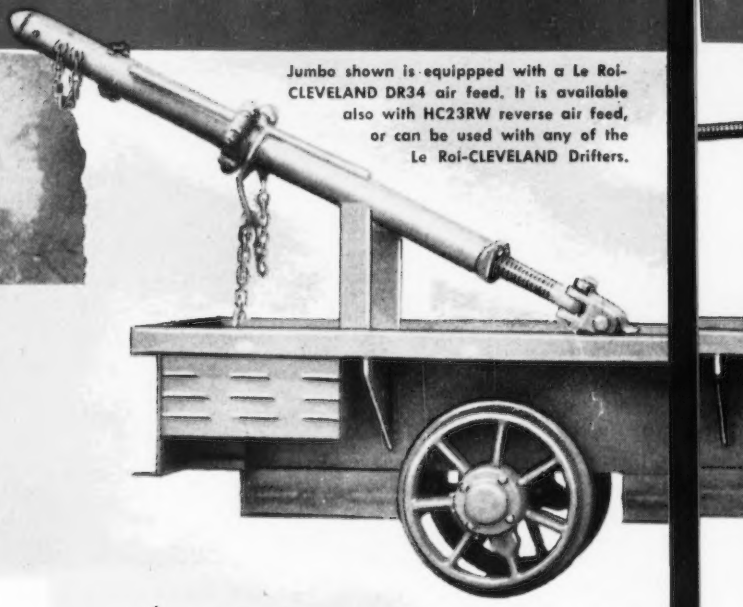
"Everything for Blasting"

ATLAS POWDER COMPANY, WILMINGTON 99, DELAWARE

Offices in principal cities

A compact Le Roi-CLEVELAND Air Motor powers the arm of this mine jumbo — miners can take it easier, yet get more done.

Space, Spot,



Jumbo shown is equippped with a Le Roi-CLEVELAND DR34 air feed. It is available also with HC23RW reverse air feed, or can be used with any of the Le Roi-CLEVELAND Drifters.

Le Roi-CLEVELAND Self-Leveling Mine Jumbo and HC23RW Air-Feed Drifter with 4′ steel-change in a Western zinc and copper mine.

Le Roi-CLEVELAND MDR Jumbo

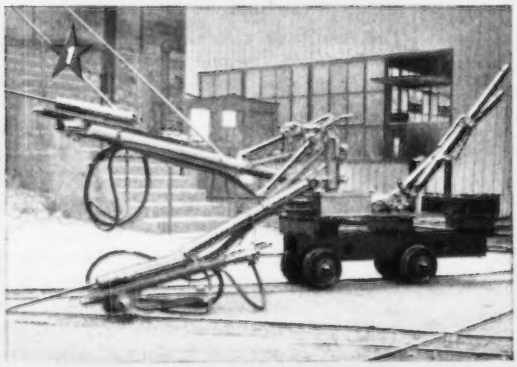
Le Roi-CLEVELAND Jumbos — equipped with air-motor-powered booms — reduce set-up time, drill out the round faster, shorten tear-down time.

To spot his drifter, the miner simply opens a conveniently located operating valve. Then a powerful, compact Le Roi Air Motor takes over, raising or lowering the boom rapidly to the desired drilling position.

What's more important, the boom stays where it's put. Drifters stay in line — there's no steel binding, no wear-and-tear on chucks. Average drilling speeds are higher.

Write for complete information.

1. Le Roi-CLEVELAND 2-Boom Jumbo with power-feed drifters about to go underground.
2. Six-drill jumbo with Le Roi-CLEVELAND power-feed drifters and air-motor booms mounted on a 1½-ton truck for tunnel job.
3. Le Roi-CLEVELAND Jumbo equipped with long-feed drifters for use with carbide-insert bits.
4. Air-motor-powered booms give fast, solid set-ups. It's mechanically impossible for booms to drift during the drilling operation.



and Drill Holes Faster!

Speed drilling cycles!	*Get better fragmentation!*
Save time drilling lifters!	*Speed loading cycles!*

Use a Le Roi-CLEVELAND Self-Leveling Mine Jumbo

with 4' steel-change Air-Feed Drifter

Want to get more drilling done per man-shift? Here's an easy way to go about it: Give your miners a Le Roi-CLEVELAND Self-Leveling Jumbo. It has everything they need to do the work you want — and cut your costs, too.

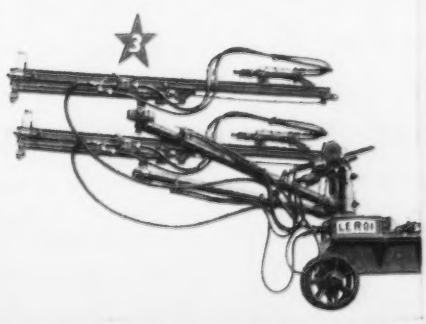
It has a self-leveling air-motor-powered arm. And that means miners can spot and space holes quickly and easily, for the most efficient fragmentation. They don't have to loosen a bolt or tilt a boom, to complete the drilling cycle.

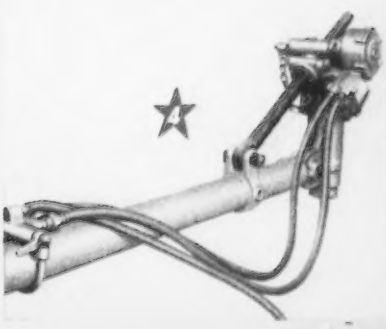
It has an exclusive rigid screw and gearing mechanism that keeps the heading straight, cuts down overbreak and underbreak. It also keeps the drifters in line, prevents the steel from binding, reduces chuck wear.

It has an offset arm that provides plenty of clearance to drill lifters. Miners don't have to take time out to swing the drill under the arm.

Together, these Le Roi-CLEVELAND features add up to faster cycles, greater tonnage per man-shift, lower costs! And that's why you owe it to yourself to get further information on both the single-arm and double-arm models. Write us today.

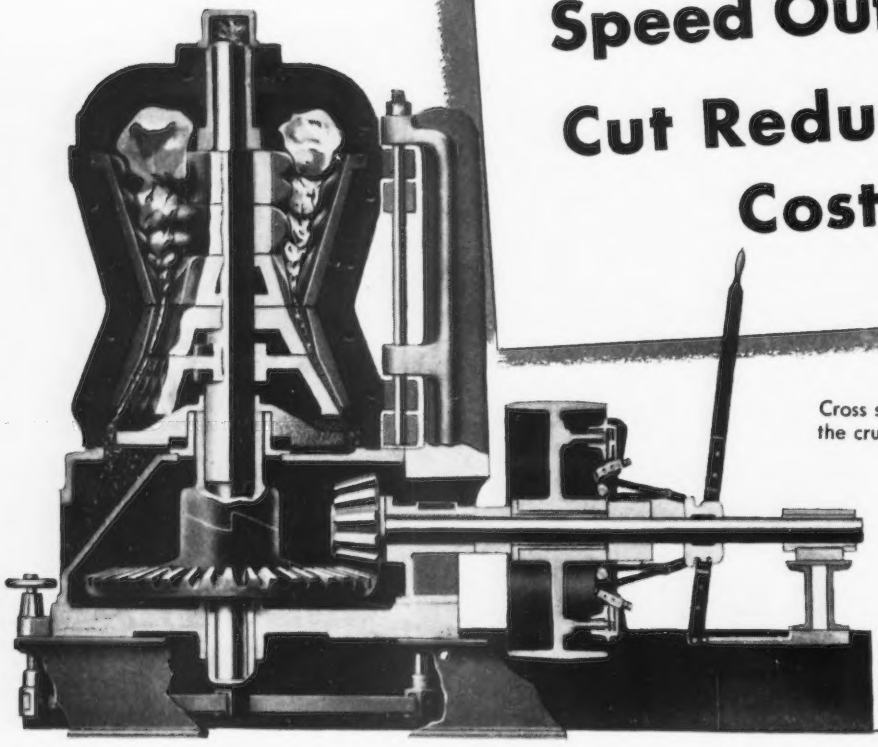
CLEVELAND ROCK DRILL DIVISION
LE ROI COMPANY
A Subsidiary of Westinghouse Air Brake Co.
12500 BEREA ROAD • CLEVELAND 11, OHIO *Plants:* Milwaukee, Cleveland and Greenwich, Ohio





RD-55

Here's How to Speed Output... Cut Reduction Cost



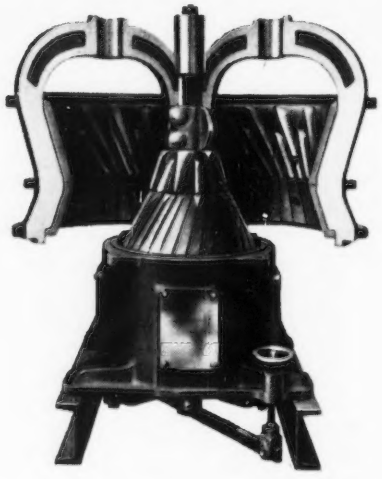
Cross section view illustrating the crushing action.

Use STURTEVANT Rotary Fine CRUSHERS

With the Sturtevant Rotary Fine Crushers you can crush or granulate to even sizes without excess dust. By simply turning the handwheel, the crusher can be quickly regulated to crush down to approximately ¼" and finer, or opened up to produce 1" size of finished product.

"Open-door" accessibility permits fast, easy, thorough cleaning.

Sturtevant Rotary Fine Crushers crush fast... do not clog. Available in output capacities from 1 to 30 tons per hour.



Sturtevant Mill Company

101 CLAYTON STREET, BOSTON 22, MASSACHUSETTS

Designers and Manufacturers of
CRUSHERS • GRINDERS • SEPARATORS
CONVEYORS • MECHANICAL DENS and
EXCAVATORS • ELEVATORS • MIXERS

an ACCO product

LAY-SET Preformed WIRE ROPE

SPECIFY... HAZARD ...the GREEN Strand Brand

Here's something your best friend will tell you— that he gets better service from HAZARD "[illegible]" Wire Rope

There's a Mighty Good Reason!

● Sure, HAZARD is made to standard specifications but there is one thing that tells you the moment you look at it that it's the best wire rope made—and that's the GREEN STRAND.

It will cost you more in the long run if you just order wire rope—where you can get it the cheapest. Just like anything else, the experience and integrity of the manufacturer are the real reason why you get longer service and better value from HAZARD Green Strand.

HAZARD Green Strand is made from the best materials, with precision, by oldtimers in the wire rope business. Then only certain constructions, carefully checked in use, are recommended for specific jobs you do. It's this combination of quality wire rope and correct recommendations that saves you money on all your wire rope purchases.

● Don't just ask for wire rope—specify, *and get*, HAZARD Green Strand Preformed Wire Rope. See your local HAZARD distributor or write our Wilkes-Barre office today for recommendations covering the equipment you operate.

makers of ACCO Registered WIRE ROPE SLINGS

ACCO

HAZARD WIRE ROPE DIVISION
AMERICAN CHAIN & CABLE

TRADE MARK

Wilkes-Barre, Pa., Chicago, Denver, Houston, Los Angeles, New York, Odessa, Tex.
Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.

EIMCO
WORLD'S FINEST TRACTOR EXCAVATOR

The 105 at work excavating semiconsolidated material. The machine shown here is on a contract job and is equipped with a 1½ cubic yard bucket equipped with long digging lip and teeth. The extra heavy design of this unit provides the necessary strength to use the machine for actual excavation work. Speed in loading is governed by the travel distance to the truck. With trucks in close the Eimco 105 can easily load at the rate of 6 to 8 yards per minute. Below—The operator sits up front in the 105 where he can get the best view of the work. Discharge of the bucket is controlled by the operator through the Eimco two speed bucket transmission.

Yes! The Eimco 105 is the world's finest tractor excavator! This is the first unit ever designed and built from the ground up with the purpose of performing as a base for heavy-duty attachments to its own frame so that it could be used efficiently for handling many jobs in addition to hauling around other equipment. The 105 is designed for heavy shock vertical loads as well as normal loads imposed through straight drawbar pull.

The Eimco 105 operates freely under all loading conditions, will dig, excavate or bulldoze on even or uneven ground because of its full oscillating track feature even with the bucket attachment.

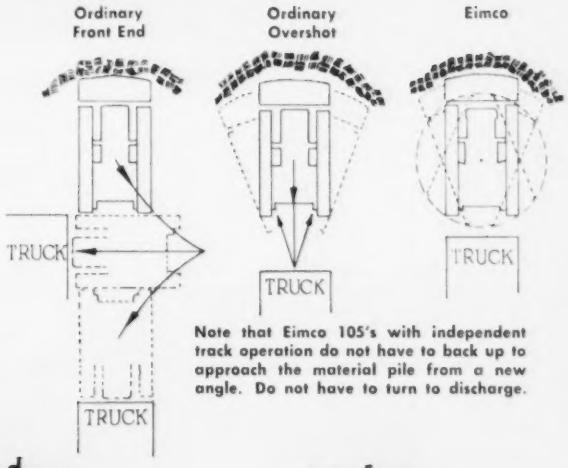
WITH COST SAVING ADVANTAGES

SAVES TIME: Simple, conveniently located handles held in one hand control all movements. Push for forward — pull for reverse — twist for spin turns. This easy control simplifies the operator's work — eliminates turning to dump — eliminates foot clutches and hand shifting and pull brakes — keeps the trucks up close and speeds up the loading cycle.

GREATER DEPENDABILITY: Simple, strong construction of the great new Eimco transmission provides greater dependability. This compact unit contains all of the gearing and clutches for speed changing and full independent reversal of each track. Every moving part is pressure lubricated. The oil-cooled, positive engagement clutches never need adjustment.

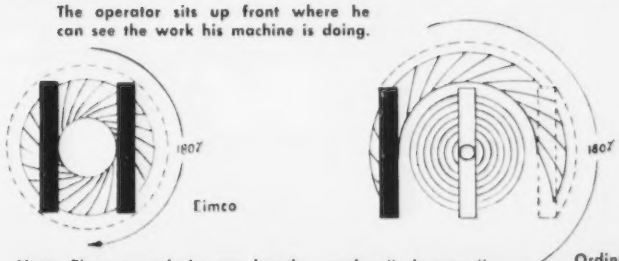
BETTER VISABILITY: The operator in the Eimco 105 sits up front where he can see the work that's being done.

GREATER FLEXIBILITY: The 105 covers the upper bracket range of work done by several models of ordinary tractor equipment in several different price and weight brackets. With the 105 priced with the lower of this group, yet powerful enough to do many of the jobs for which the larger, more expensive, units are employed.



Note that Eimco 105's with independent track operation do not have to back up to approach the material pile from a new angle. Do not have to turn to discharge.

The operator sits up front where he can see the work his machine is doing.



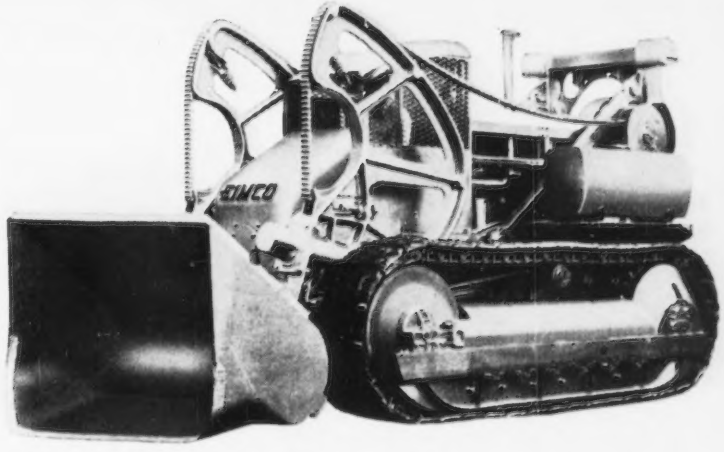
Note: Eimco turns in its own length — makes "spin turns." Ordinary tractors lock one track and walk around.

Ordinary Tractor

THE EIMCO CORPORATION
Salt Lake City, Utah, U.S.A.
Export Office: Eimco Bldg., 52 South St., New York City

A-98

STRONGER CONSTRUCTION THROUGHOUT: The 105 is made of steel — not cast iron. There is quite a difference in these two construction materials. Cast alloy steel as used in the 105 is not subject to shock cracks even under severe operating conditions. Steel stands strains and stresses imposed by heavy loads without danger of failure. The Eimco 105 is the only crawler unit made of steel and gives you a superior machine with longer dependable life and lower maintenance costs. This is the machine for your next heavy job. Let us send an Eimco engineer to tell you the facts.



The Eimco 105 — world's finest tractor-excavator

OPERATOR REPORTS

Production up — Maintenance down

Twenty of these Allison TORQMATIC-equipped trucks are working 21 hours a day hauling 34-ton pay loads of coal and overburden over 7½% grades.

The Wadesville Production Company operates 20 Allison TORQMATIC-equipped Euclid rear-dump trucks hauling 42,000 tons daily in its strip mine near St. Claire, Pa. These trucks boost production by making round trips 25% faster than the mechanical-drive units they replaced.

This operator's records show TORQMATIC DRIVES outlast mechanical drives — maintenance time and costs are down too. At routine overhaul periods, mechanics change out the TORQMATIC DRIVES in 2 hours less time than they change out a mechanical drive.

You, too, can cut your heavy-duty equipment operating costs by specifying Allison TORQMATIC DRIVES the next time you buy. Ask your equipment dealer, manufacturer or write:

ALLISON *Division of* GENERAL MOTORS
Box 894MM, Indianapolis 6, Indiana

ALLISON TORQMATIC DRIVES

Unbeatable Team for Maximum Operating Economy

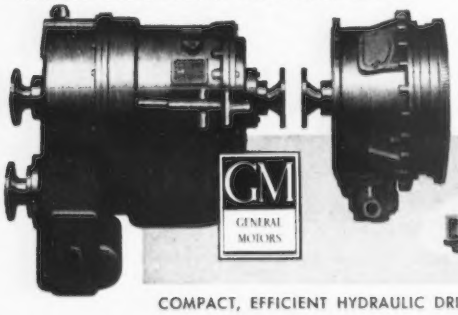
**Quick-shifts* at full throttle with fingertip hydraulic control.

**Holds* power to load at all times — no clutch pedal to push—no gearshift guess.

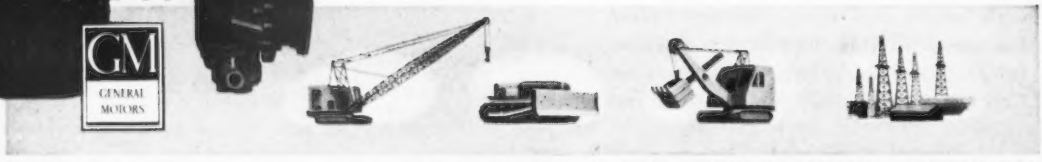
**Cuts* maintenance cost by absorbing shock — eliminates engine lugging — prolongs equipment life.

**Only* torque converter-transmission team designed to work as a unit and built by one manufacturer.

MATCHED UNITS BUILT BY ONE MANUFACTURER



Allison TORQMATIC DRIVES



COMPACT, EFFICIENT HYDRAULIC DRIVES FOR CRANES * TRUCKS * TRACTORS * SHOVELS * SCRAPERS * DRILLING RIGS

LOOK TO MANCHA

for Storage Battery Locomotives that exactly meet your mine conditions

Heavy haulage service . . . gathering . . . light tramming—whatever your needs—there's a Mancha Storage Battery Locomotive designed to fit your particular requirements. Built in a wide range of sizes, horsepower, and battery capacities, Mancha locomotives operate efficiently, dependably, and safely. In mines all over the world, they're piling up production records that spell *extra profit every shift* for their owners.

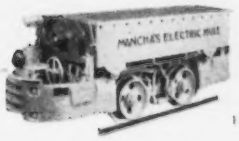
2590

3-MINUTE BATTERY CHANGE —NO MANUAL LABOR!

Mancha's famous transfer rack makes battery changing a one-man job—without manual labor.

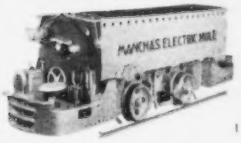
569

HERCULES A
7½ TO 9½ TONS



1481

HERCULES
6 TO 7¼ TONS



1595

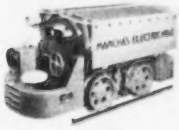
STANDARD AN
4¼ TO 6 TONS

917

STANDARD A
4 TO 5 TONS

1617

TITAN AN
3 TO 4 TONS



1578

TITAN BN
2 TO 2½ TONS

1714

LITTLE TRAMMER
1½ TONS

Will a MANCHA pay in your mine?

Send for our Mine Haulage Data-Form and get the answer. Mail the coupon *today*.

MANCHA STORAGE BATTERY LOCOMOTIVE
Division GOODMAN Manufacturing Company
4850 SOUTH HALSTED STREET CHICAGO 9, ILL., U. S. A.

Mancha Storage Battery Locomotive
Division GOODMAN Manufacturing Company
4850 South Halsted Street,
Chicago 9, Ill., U.S.A.
E&MJ-1253
Send your Mine Haulage Data-Form

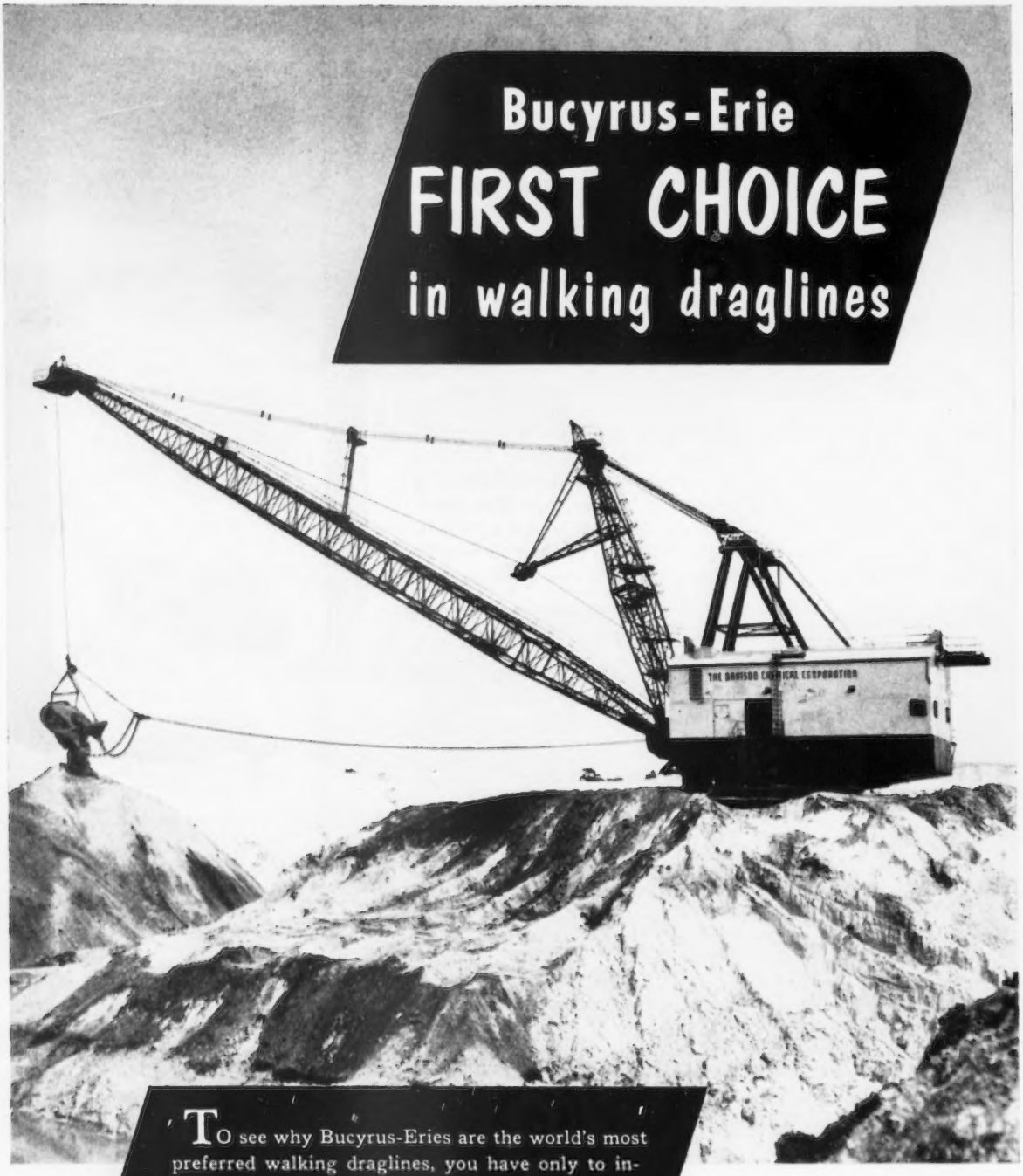
Name _____

Firm _____

Address _____

City _____ Zone _____ State _____

Bucyrus-Erie
FIRST CHOICE
in walking draglines



To see why Bucyrus-Eries are the world's most preferred walking draglines, you have only to investigate their record on large-scale mining operations the world over. Dependable big output; long reach; easy, accurate moveups have made them favorites for stripping jobs. The number of these machines in successful operation is a measure of their ability to cut stripping costs and to deliver big yardages with top economy. 1853

The 650-B, shown here, is equipped with booms up to 215 ft. long. One of the largest Bucyrus-Erie electric Walking Draglines, it has individual hoist and drag drive motors, twin drag ropes, and Ward Leonard variable voltage rotating control.

BUCYRUS ERIE

BUCYRUS-ERIE CO.
South Milwaukee, Wisconsin

Me? Ride to work on wire rope?

That's right. In the course of a year this young lady may travel as much as 150 miles with the aid of wire rope that safely and swiftly whisks her elevator aloft and then just as safely returns it to ground level. It's quite likely that she gets to her job with an assist from Wickwire Rope. Here again—as in so many other fields where wire rope is used—men who manage and maintain the nation's tall buildings have learned to place unbounded faith in the safety and reliability they get from Wickwire Rope.

A YELLOW TRIANGLE ON THE REEL IDENTIFIES WICKWIRE ROPE

THE COLORADO FUEL AND IRON CORPORATION—Abilene (Tex.) • Denver
Houston • Odessa (Tex.) • Phoenix • Salt Lake City • Tulsa
PACIFIC COAST DIVISION—Los Angeles • Oakland
Portland • San Francisco • Seattle • Spokane
WICKWIRE SPENCER STEEL DIVISION—Boston • Buffalo • Chattanooga
Chicago • Detroit • Emlenton (Pa.) • New Orleans • New York • Philadelphia

1854

WICKWIRE ROPE

CF PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

P-A VENTURI GAS SCRUBBERS

Here's why ONE INSTALLATION leads to another

Repeat business is a sure sign of client satisfaction in any field. That's why the record of repeat installations of Chemico P-A Venturi Scrubbers is impressive. Most Chemico installations currently underway have predecessors in the same company or in the same scrubbing field.

Multiple installations are presently in service scrubbing sulfuric and phosphoric acid mists, metallurgical dusts and many other of the *more difficult* fumes encountered in the chemical industry.

If you have a serious air pollution or waste recovery problem not in our experience file, we will be glad to send one of our experienced engineers to make reliable pilot tests at your plant with our portable equipment.

1. *Low capital cost*

   WHY are capital costs low?
   Because of simplicity of design.

2. *Low maintenance expense*

   WHY are maintenance costs low?
   Because there are no complex accessories required to maintain units at top performance levels.

3. *High collection efficiency*

   WHY are collection efficiencies so high?
   Because the patented feature of the P-A Venturi induces a high degree of particle agglomeration.

Phone (MU 8-2370) or write our P-A Sales Dept. for further information and ask for our Bulletin M-102 on P-A Gas Scrubbers.

CHEMICAL CONSTRUCTION CORPORATION

A UNIT OF AMERICAN CYANAMID COMPANY

488 MADISON AVENUE, NEW YORK 22, N. Y.

Technical Representatives Throughout the World • Cables: Chemiconst, New York

CC-250

Crane rental company increases safety with these Improved Tiger Brand Boom Supports

The new Tiger Brand Boom Supports on this 25-ton Cranemobile can be inspected visually, because there are no sockets to hide part of the rope. What's more, interwoven ends distribute vibration over a longer part of the rope—keep these improved boom supports in safe operating condition 2 to 3 times longer.

Last year, Lee Crane Service, Inc., Boston, Mass., added an extra measure of safety to every one of its 14 truck cranes. It removed apparently sound—but potentially dangerous—boom supports equipped with ordinary zinced sockets and installed new Tiger Brand Boom Supports.

Visual inspection now possible

Here are the reasons for this change, as told by Mr. Joseph Veanor, owner of Lee Crane Service: "Easy *visual* inspection is the reason we switched to Tiger Brand Pendants. With the old zinced-socket type, we could never be positive that a pendant was completely safe because the sockets hid part of the rope.

"These Tiger Brand Pendants completely eliminate the use of sockets. As a result, we can see and inspect *every* part of the rope. If any wires are broken, we can replace the pendant before a failure occurs. In that way, we can be sure that every one of our booms is completely safe."

Last 2 to 3 times longer

Tiger Brand Boom Supports last longer than the old-fashioned socket type, because each end of the wire rope is tightly and permanently interwoven. This spreads strain and vibration over a much longer section of the rope, instead of concentrating all the strain right at the socket. As a result they last 2 to 3 times longer than other types.

Easily installed

Lee Crane Service had no trouble converting to these modern Tiger Brand Boom Supports. All fittings are standard size, so no alteration of equipment was required.

Send the coupon for more information on these improved boom supports. Or get in touch with our nearest sales office.

AMERICAN STEEL & WIRE DIVISION, UNITED STATES STEEL CORPORATION
GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO - TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

U·S·S AMERICAN TIGER BRAND WIRE ROPE USS *Excellay Preformed*

American Steel & Wire
Rockefeller Building
Cleveland 13, Ohio

Please send my free copy of your descriptive folder on Tiger Brand Wire Rope Boom Support Assemblies.

Name.....
Company.....
Address.....
City.....Zone....State.....

UNITED STATES STEEL

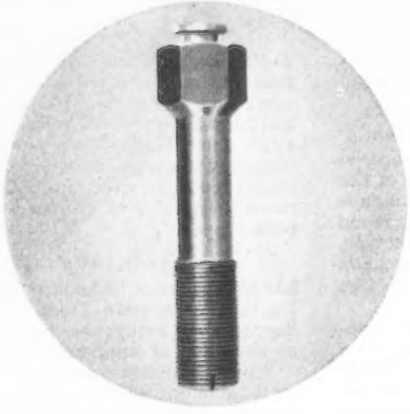
LUBRICATE PLUG VALVES

in seconds — instead of minutes

with this timesaving combination

Yes, seconds are all it takes to lubricate plug valves, today. You'll eliminate waste, and save time and effort with this combination: Walworth High Pressure Lubricant Gun, Walworth Button-Head Fittings, and Walworth Jumbo Size Lubricant Sticks. They'll pay for themselves quickly and are adaptable to most of the lubricated plug valves that are in use today.

Walworth High Pressure Lubricant Gun. This is the only gun available today that satisfactorily handles the stick form, full-bodied lubricants needed for proper lubrication and sealing of plug valves. Easy to operate; two Jumbo Size Lubricant Sticks fill the barrel.



Walworth Button-Head Lubricant Fittings. Use them as lubricant fittings or as regular lubricant screws with standard size lubricant sticks. Just slip hose coupling onto fitting for a leakproof connection.

Walworth Jumbo Size Lubricant Sticks. Individually wrapped and packed ten to the box; clean and easy to handle . . . eliminate messy loading. Types available for most line fluids. Always use Walworth Lubricants in Walworth Lubricated Plug Valves.

Start saving today . . . call your nearby Walworth Distributor. He'll be glad to supply Walworth High Pressure Lubricant Guns, Button-Head Fittings, and the right Jumbo Size Lubricant Sticks for any lubricated plug valve service condition.

WALWORTH

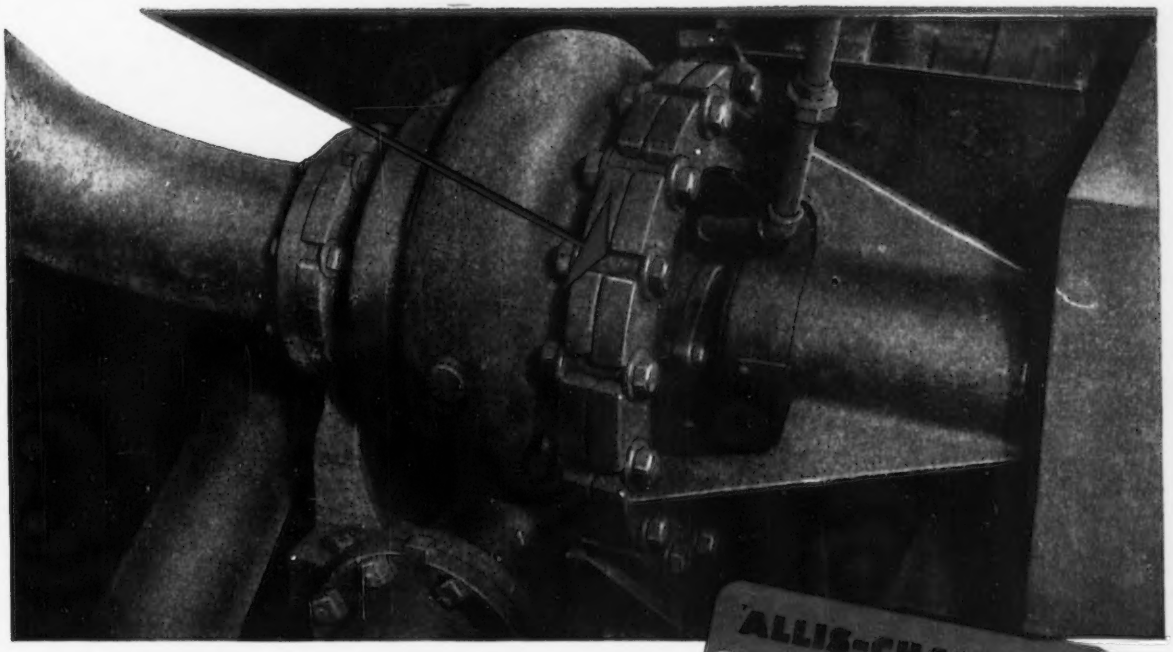
Manufacturers since 1842

valves . . . pipe fittings . . . pipe wrenches

60 East 42nd Street, New York 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

Here's a Pump That Maintenance Men Like



ALLIS-CHALMERS Solids Handling PUMP

- **All maintenance points are easy to reach**
- **Pump can be taken down and returned to service in less than a half hour**
- **Many parts are interchangeable between different pump sizes**

THE Allis-Chalmers solids handling pump is ruggedly built to stand rough solids handling service. And it's easy to work on. Notice how accessible the packing gland is. See how the casing bolts are arranged. Just loosen the nuts a couple of turns and the bolts lift out.

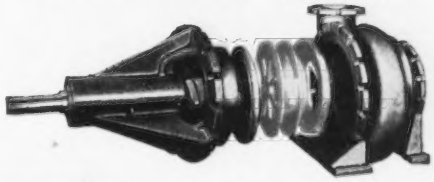
Wearing parts separate into easily handled units. In fact, one man can tear down an Allis-Chalmers solids handling pump, replace a part and have it back in action again *in less than a half hour*. Piping need not be disturbed unless the casing is replaced.

Complete Pumping Unit Furnished . . . Allis-Chalmers can furnish the complete pumping unit — pump, motor, *Texrope* drive and control — assembled and ready to install and run. A *Vari-Pitch* V-belt drive makes it possible to vary head and capacity at the turn of a crank.

Get the Complete Story . . . Every Allis-Chalmers solids handling pump is application engineered by a specialist who knows solids handling equipment problems and how to solve them. Your nearby Allis-Chalmers representative will be glad to give you complete facts and figures on CW pump performance. Or write Allis-Chalmers, Milwaukee 1, Wisconsin and ask for Bulletin 52B6381.

A-4137

NOW . . . even longer wear



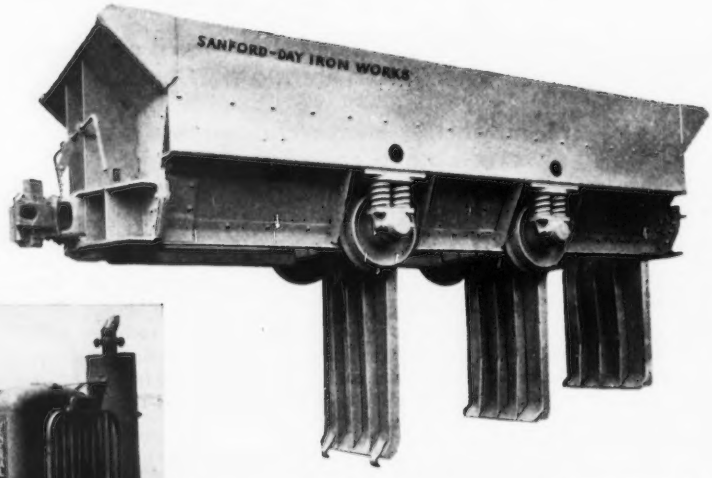
Impeller and suction plate now made of *Ni-Hard* alloy at no extra cost. You get longer wear, lower pumping costs.

Texrope and *Vari-Pitch* are Allis-Chalmers trademarks.

ALLIS-CHALMERS

Sanford-Day... the mining industry's Super

POTASH CAR BUILT BY SANFORD-DAY . . . This car shown at right is one of the S-D Automatic Bottom Dumping Cars built for U. S. Potash Co. for their Carlsbad Mine. We built these cars of one-half inch steel for heavy duty performance. The car represents another Sanford-Day development toward extending the life of cars in tough service, to increase haulage efficiency and reduce maintenance costs.



SALT CARS BUILT BY SANFORD-DAY . . . Shown at left are the S-D Automatic Bottom Dumping Mine Cars built by Sanford-Day for Leslie Salt Company many years ago. These cars, constructed of wood to handle salt, are still in operation. They are an example of the emphasis Sanford-Day places on the important details of construction to enable you to obtain more years of service from your cars.

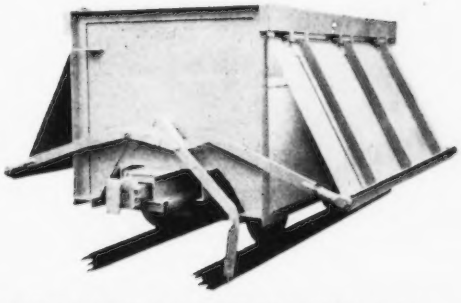
SANFORD-DAY IRON WORKS,

Market for mine cars!

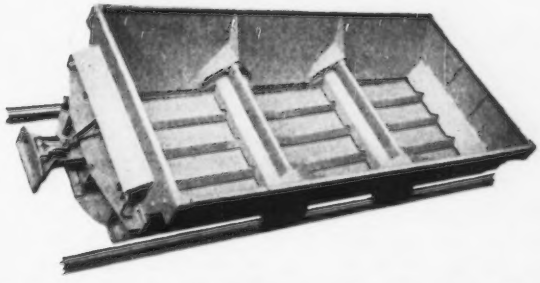
When you need mine cars you want cars built to meet your own requirements. Sanford-Day is your Super Market for mine cars.

We have listed above many of the various purposes for which we have built mine cars. The photos on these pages show a few of the many types of cars we have built for coal, metal and non-metallic mines.

Regardless whether you need one car or 101, don't hesitate to get one of our engineers into your mine with your officials—face to face with your problem. With this type of cooperation, plus our facilities and capacity to build any type mine car of any size, any haulage problem in your mine can be solved.



GABLE BOTTOM CAR BUILT BY SANFORD-DAY . . . We show above one of the 101 Sanford-Day Gable Bottom Cars being built for a customer in Nevada. The car features all-welded instead of riveted construction. It has smoother bottom, ends and sides for free flow of materials when dumping.



GYPSUM CAR BUILT BY SANFORD-DAY . . . Here is another S-D Automatic Bottom Dumping Car development for metal and non-metallic mines. This car is one of many specially built for Certain-Teed Products Corp. for hauling gypsum . . . hauling non-stop because S-D Automatics dump on the move. Extra heavy steel plates were used in the construction to absorb shock loads.

KNOXVILLE, TENN.

After 50 years of leadership in the industry, Sanford-Day still devotes its entire capacity to the production of mine cars. Most improvements in mine cars originate with this company.

The Engineer's Report

CASE HISTORY

PRODUCT *Chevron Starting Fluid*

FIRM *Young Truck Lines, Salt Lake City, Utah*

Starting fluid saves 1152 man-hours per winter!

A LITTLE CHEVRON STARTING FLUID, injected into the intake on the diesel engine of this truck, starts it instantly in temperatures far below zero. The fast starts eliminate delays that amounted to at least 16 hours per week on each of 6 trucks like this operated by Harry L. Young and Sons, Inc., Salt Lake City. Used for hauling mining machinery in the mountain states, these trucks often must be parked outside over night where it is extremely cold. Chevron Starting Fluid starts them anywhere they go without the aid of booster batteries. It is available in 1-pint cans, and in 7- and 17-cc capsules. In 9.9-cc pressure primer steel bulbs, ask for Chevron Priming Fuel. Your fluid supplier also has special primer equipment.

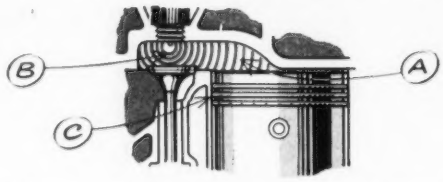
FREE FOLDER tells you more about Chevron Starting Fluid and where to apply it on different engines. Write or ask for it today.

FOR MORE INFORMATION about petroleum products of any kind or the name of your distributor, write or call any of the companies listed below.

CHEVRON STARTING FLUID

TRADEMARK REG. U.S. PAT. OFF.

How CHEVRON Starting Fluid Starts Gasoline and Diesel Engines Instantly



A. Atomizes in lowest temperatures and provides easily ignited vapor in combustion chamber.

B. Pressure, or the weakest spark, fires mixture—turns engine and heats air for regular fuel mixture.

C. Contains lubricant and additives—inhibits cylinder wear and ice formation in primer equipment.

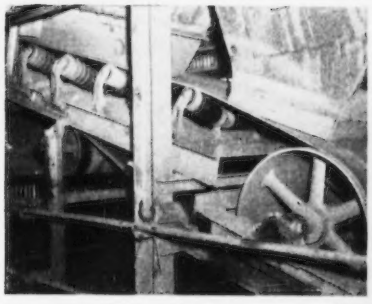
STANDARD OIL COMPANY OF CALIFORNIA, San Francisco 20 • STANDARD OIL COMPANY OF TEXAS, El Paso
THE CALIFORNIA OIL COMPANY, Barber, New Jersey • THE CALIFORNIA COMPANY, Denver 1, Colorado

S-A CONVEYING Systems set

NEW TONNAGE RECORDS HERE!

An S-A 1200-foot Belt Conveyor and its associated equipment, has increased the loading capacity of this ore dock by as much as 50%. Another case history of S-A Conveying Systems in action.

When an S-A engineer digs into any bulk handling problem, he brings to it a wealth of experience. It has been gained through thousands of S-A Systems engineered to meet just about every kind of bulk handling need. He works with a *complete* line that includes every type of bulk handling equipment. With this "know-how," plus the equipment to back it up, he can *always* recommend the combination that's best for *you*, to do *your* job at lowest cost per ton. A letter will make his services available to you.



S-A Simplex Carriers are used throughout, with pneumatic shock-type carriers at loading and transfer points.

Ore from the stock-pile is picked up by the bridge and dumped into a 60-ton hopper. It is transferred by an S-A Amsco Feeder from the hopper to the 42", 1200-foot conveyor belt. At the far end, an inclined belt discharges into a 100-ton surge bin. Another Amsco Feeder delivers the ore to a weigh hopper, from which it is chuted into rail cars.

Belt Conveyors
Belt, Pan and Plate Feeders
Ship Loading Boom Conveyors
Stacking Conveyors
Storage and Reclaiming Systems
"Natural Frequency" Vibrating Conveyors
REDLER Conveyor-Elevators
ZIPPER Conveyor-Elevators
Conveyor Belt Cleaners
Headshaft Holdbacks
Grizzlies and Screens
Centrifugal Pilers
Bin Gates and Tunnel Gates
Car Pullers and Spotters
Bucket Elevators
Skip Hoists
SEALMASTER Ball Bearing Units

• Write for a bulletin on any of the above.

STEPHEN S-A DAMSON MFG. CO.

13 Ridgeway Avenue, Aurora, Illinois — Los Angeles, Calif., Belleville, Ontario

DESIGNERS AND MANUFACTURERS OF ALL TYPES OF BULK MATERIALS HANDLING EQUIPMENT

Modern methods speed opening

SINCE the end of World War II, modernization has reached into many fields of the Turkish economy. New airports and roads have been built, factories erected, and new mines opened. With this stepped-up economy, the search for vitally-needed coal, too, has spread.

One important development is at Kozlu, on the Black Sea. Here Eregli Coal Fields Exploitation, of Zonguldak, is sinking several shafts to reach extended underground bituminous deposits. Perhaps the busiest unit on their project is a 4-wheel rubber-tired Tournatractor with dozer blade.

1 Tournatractor replaces 2 crawler-tractors and 1 grader

With its faster than crawler-tractor speeds, 19 mph (30 km/h.) instead of 3 to 6 mph (5 to 8 km/h.), Tournatractor handles many widely-scattered maintenance assignments. Its primary task is maintaining 2 areas where material excavated from the new mine shafts is dumped. To handle this work, Tournatractor shuttles 6/10 of a mile (1 km.) between the dumps and levels all the muck, rock and shale hauled to the 2 locations by *eight* 22-yd. (16 m^3) capacity trucks. This fast rubber-tired tractor also grades $3\frac{1}{2}$ miles ($2\frac{1}{4}$ kilometers) of haul road twice a day. In spare time, it cleans spillage from around the mine shafts. Mine officials report that the *one* Tournatractor does the same amount of work on all these tasks as did the *two* track-type tractors and the *one* motor patrol it replaced.

Tires reduce maintenance costs

Most of this increased efficiency is the result of using tires instead of tracks. Tournatractor can travel at 19 mph (30 km/h.) as well as work at higher speed than a crawler-tractor. With tires, there is no need for expensive repairs or the time-consuming lubrication necessary with the 400 to 500 parts of an average track assembly.

You can obtain similar efficiencies and lower equipment costs on your mine exploration and development program. Let us help you check Tournatractor savings. Units are available for dollars or pounds sterling.

# of new coal mine in Turkey

Tournatractor levels muck at dump area located on the shore of the Black Sea. With big tires and 186 hp, unit has plenty of traction to work in the slick material. When dump has been brought up to level, it will be used as a storage area for mine timber supports.

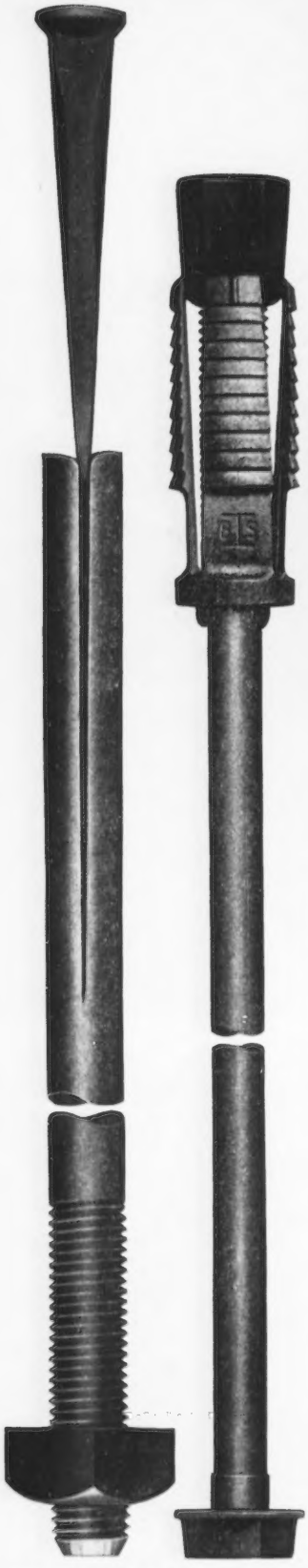
Leveling present timber storage area, Tournatractor dozes earth and rock. Unit later will spread loose fine earth over the rough rock to provide a smooth level working space.

Tournatractor makes cut along base of cliff to build haul road to new dump area. Blade carries 2½ cubic yards (1.9 cubic meters) of material per pass.

Tournatractor—Trademark D-326-M

LeTourneau-Westinghouse Company

EXPORT DIVISION, PEORIA, ILLINOIS, U.S.A. (Cable Address: "LETWESCO")



I Sure Like Roof Bolts!

"I've been around mines a long time, and I've seen many improvements over the years. But the one that really strikes me is these roof bolts. Now take this mine. We're using roof bolts in all new workings. It cuts down our accident rate, and gives us more room for mechanized equipment. I'm sold on 'em."

In many mines, operators are obtaining increased production and promoting greater safety for workers by using roof bolts in entries and air courses. This method of roof control eliminates the need for space-consuming timber supports, and improves ventilation.

To enable operators to obtain these desirable conditions, Bethlehem produces two types of roof bolts:

SQUARE-HEAD BOLT—The ¾-in. square-head bolt is furnished with an expansion shell, and is for use in a 1⅜-in. hole. It has rolled threads and an unchamfered head. Pressed ears on shank support the shell during anchoring. When bolt is tightened, the leaves of shell expand, locking against sides of hole to provide holding pressure.

SLOTTED BOLT—This 1-in. bolt has a well-centered, forged slot to receive a steel wedge. No metal is removed by slotting. The other end of bolt has 5 in. of 1-in. rolled threads. When driven in 1¼-in. hole, the wedge is forced into slot, expanding bolt-end. Truncated-cone point prevents thread damage. Fitted with American Standard Regular Square Nut.

Bethlehem Roof Bolts come in lengths of from 2 ft to 8 ft, and can be installed vertically or at angles. Shipment can be made promptly from stock. For full details, write to us at Bethlehem, Pa.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

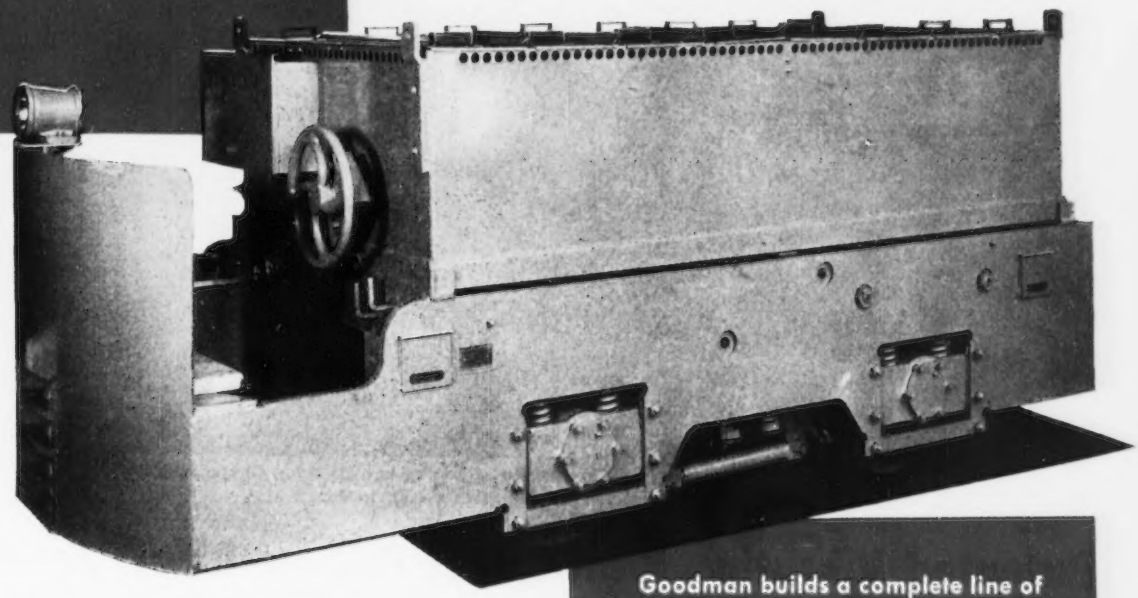
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM MINE ROOF BOLTS

✓ SAFE OPERATION
✓ CONTINUOUS SERVICE
✓ LOW MAINTENANCE
✓ LONG LIFE

YOU GET THEM ALL
IN
Goodman
METAL MINE LOCOMOTIVES



Each Goodman locomotive is recommended for a particular job only after a thorough study of mine requirements, now and in the future.

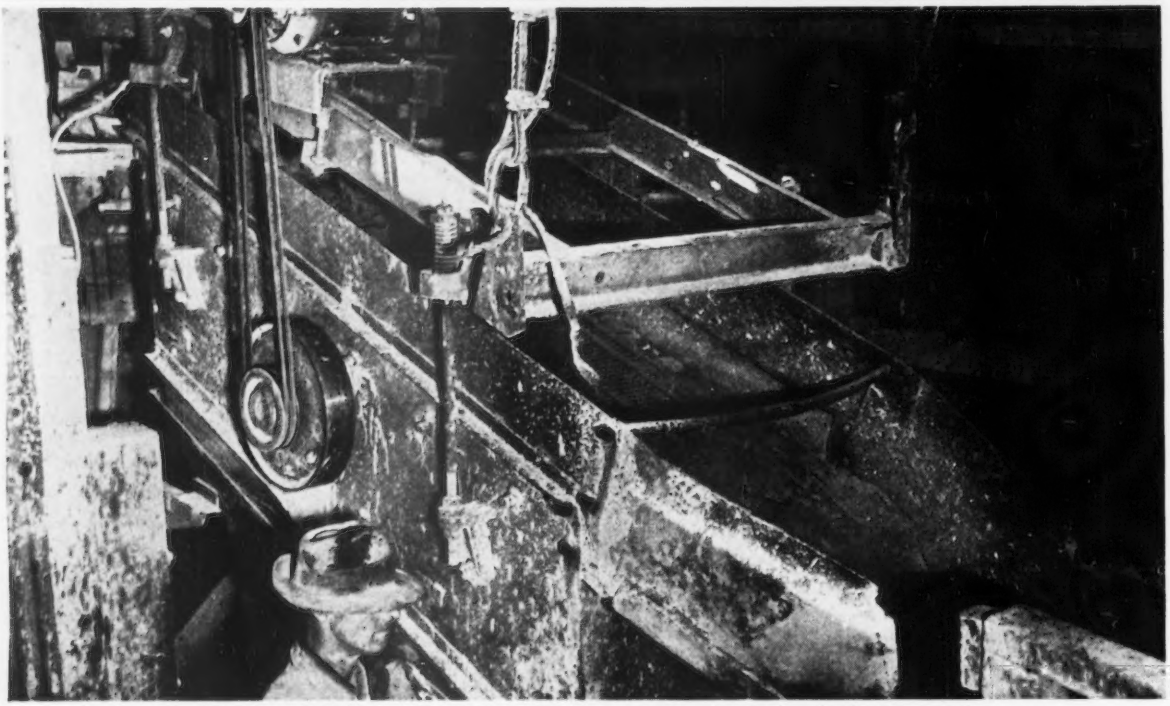
So dependable is Goodman locomotive performance, so rare the interruptions of haulage, that production every shift is at its maximum. Rugged construction keeps maintenance and depreciation charges to a minimum.

Goodman builds a complete line of trolley and storage battery locomotives. Illustrated here is a 4-ton (chassis weight) storage battery unit for 36″ gauge. Over-all dimensions: length 12′ 8″, width 56″; height (over battery box) 59″. Wheelbase is 54″. A feature is slow speed armatures with single reduction gearing. Each of its two motors is 19 hp at 80 volts; rated drawbar pull is 2,000 lbs. at 4½ mph.

Goodman MANUFACTURING COMPANY
HALSTED STREET at 48th • CHICAGO 9, ILLINOIS
CUTTING MACHINES • CONVEYORS • LOADERS • SHUTTLE CARS • LOCOMOTIVES

DENVER-DILLON VIBRATING SCREENS

Complete Milling Equipment—from testing, to feeder, to dryer!



The Denver-Dillon Screen is pictured above operating in a Colorado fluorspar mill where it saves time, labor and money by giving fast, thorough size separation.

Patented Vibrating Principle of Denver-Dillon Screens Produces Fast, Clean Separation

The patented true-circle vibrating motion of the Denver-Dillon Screens provides fast, thorough size separation. This true-circle action quickly stratifies the bed, gives an even flow of material down the screen, and repeatedly turns the material to aid the passage of undersize through the screen.

Vibration is uniform so there are no dead spots or violent vibrations which bounce the rock off in one or two jumps. The result is a smooth flow of lightly dancing material spread over the entire surface of the screen which gives you fast, clean screening. Save time, labor and money by getting size separation the first time over your screen.

EXTRA LONG LIFE

Both screen cloths and screen bodies have extra long life because the vibrating motion is a "true circle" motion. Entire screen travels in small perfect circles. Each screen is adjusted and set in our shops so that the flywheel mechanism is perfectly balanced for uniform true-circle vibration of the entire screen. Dependable mechanism assures continuous, trouble-free operation. Special camber bars prevent screen whipping, increase screen cloth life.

UP TO 50% POWER SAVINGS

Besides maintenance savings, the patented two-bearing principle of the Denver-Dillon Screen offers up to 50% power savings over four-bearing mechanisms. This is because the Denver-Dillon Screen is spring suspended and the shaft bearings carry only the weight of the vibrating mechanisms. The screen is suspended free to "float" and follows true circle motion with minimum of friction loss.

DELIVERY FROM STOCK

We have a stock supply of many Denver-Dillon Vibrating Screens for immediate delivery. Screen sizes range from 1′ x 2′ thru 6′ x 14′, maximum of four decks.

Write or wire today—find out how you can increase production and profits; get faster, cleaner size separation and long screen life with a Denver-Dillon Screen! **Free Technical Bulletin On Request**

Over 25 years of Flotation Engineering

DENVER EQUIPMENT COMPANY

1400 SEVENTEENTH ST. DENVER 17, COLORADO

Maximum Footage – Maximum Economy

with JOY DUAL-VALVE SILVER STREAK DRILLS

In tunnels, crosscuts, drifts, or stopes, Joy *Silver Streak* Rock Drills with the DUAL VALVE will do your drilling job faster, and use less air with lower maintenance. Here's why—

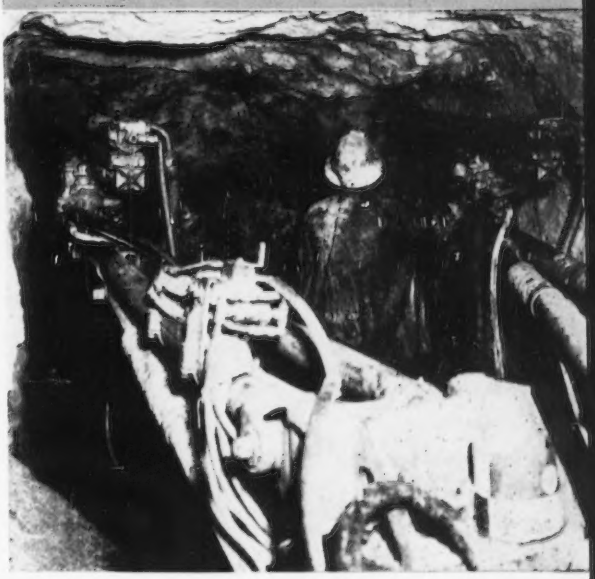
(1) The exclusive DUAL VALVE, a feature of all Joy rock drills, makes air do more work. By admitting the correct amount of air behind the piston and excluding air ahead of it during the drilling stroke, maximum force is exerted on the drill steel. There's no cushion of air ahead of the piston to reduce the force of the blow. Then the rear section of the Dual Valve meters the correct amount of air ahead of the piston to force it back with a "snappy" rotating action. This adds up to more power-packed strokes per minute, for faster drilling with less air.

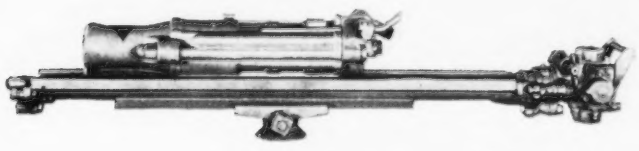
(2) The silver-like cadmium plating on Joy *Silver Streak* Rock Drills aids lubrication while running-in, protects parts from rust while in stock, and keeps maintenance costs at a minimum.

The Joy line is complete. There's a *Silver Streak* rock drill for every rock breaking need. Types included are drifters, stopers, hand-held drills, Hydro Drill Jibs. To complete the line, there are wagon drills; the QB-20 for line drilling and dimension stone quarries; rubber-tired, self-propelled Drillmobiles; and specially mounted drills for special needs. Let our Field Men work with you. • *Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.* In Canada, *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

JOY DUAL VALVE

"Makes Air do More Work"





JOY DRIFTERS

For use on mobile jumbo units, as at right, or for column mounting, Joy Drifters are built in three sizes—all with fast, powerful Dual Valve action. Efficient Pistonmotor Feed, with only two moving parts, provides strong, steady, advancement and retraction. One-piece locking chuck increases bearing area and reduces wear on lock ring and chuck bushing.

Consult a Joy Engineer

JOY

W&D 3760

WORLD'S LARGEST MANUFACTURER OF UNDERGROUND MINING EQUIPMENT

THE BOSTON MAN
IN 1953

TO THE BUYER OF INDUSTRIAL RUBBER PRODUCTS . . . Here is a handy, easy-to-file list of some of the many Boston Men throughout the country . . . production experts specializing in industrial rubber products. With this list on file, you can quickly and easily locate a Boston distributor near you . . . and put his industrial rubber experience and know-how to work for you.

ALABAMA
Mill & Textile Supply Co., Birmingham

ARKANSAS
Little Rock Road Machinery Co., Little Rock

CALIFORNIA
Warren & Bailey Company, Los Angeles
Mission Pipe and Supply Co., San Diego
L. P. Degen Belting Company, San Francisco
Gilmore Steel & Supply Co., San Francisco

COLORADO
Johnson Supply Co., Denver

CONNECTICUT
The Bidwell Rubber Company, Hartford
W. I. Clark Company, New Haven

FLORIDA
Farquhar Machinery Company, Jacksonville
Central Machinery & Supply Co., Miami
Mill Supplies Inc., Orlando
Knight & Wall Company, Tampa

GEORGIA
Boykin Tool & Supply Company, Atlanta
Toole Supply Co., Inc., Augusta
Corbin Supply Company, Macon
Fleming & Moore Supply Co., Savannah

ILLINOIS
Simmons Supply Company, Cairo
Boston Woven Hose & Rubber Co. of Pittsburgh, Chicago Division, Chicago
Barrett Hardware Co., Joliet
Couch & Heyle, Inc., Peoria
Factory Supplies Co., Rockford
W. M. Hales Co., Inc., West Frankfort

INDIANA
Haush Industrial Supplies, Inc., Evansville
National Mill Supply, Inc., Fort Wayne
W. J. Holliday & Company, Indianapolis
Biggs Pump & Supply, Inc., Lafayette
Industrial Supply Company, Terre Haute

IOWA
W. C. Brown Supply Company, Fort Dodge

KANSAS
Joplin Supply Company, Baxter Springs
Supply Service Company, Hutchinson
Phillips & Easton Supply Co., Wichita

KENTUCKY
Industrial Division, Womwell Automotive Parts Company, Lexington
Davis Rubber & Supply Company, Louisville
Ohio Valley Supply Company, Paducah

LOUISIANA
Woodward, Wight & Co., Ltd., New Orleans
Midland Belting and Supply Co., Shreveport

MAINE
W. L. Blake & Co., Portland

MARYLAND
Free State Equipment Co., Inc., Baltimore
Kauffman Manufacturing & Supply Co., Hagerstown

MASSACHUSETTS
Hedge Mattheis Company, Boston
Hinds & Coon Co., Boston
The Greene Rubber Company, Cambridge
Babbitt Steam Specialty Co., New Bedford
Chase Turbine Manufacturing Co., Orange
Berkshire Mill Supply Company, Pittsfield
W. J. Foss Company, Springfield
Mechanics Rubber Company, Worcester

MICHIGAN
Ohio Rubber Supply Co., Detroit
Delta Hardware Company, Escanaba
Barclay Ayers & Bertsch Co., Grand Rapids
Bond Supply Company, Kalamazoo

MINNESOTA
Marshall-Wells Company, Duluth
Strong-Scott Manufacturing Co., Minneapolis
Wm. H. Ziegler Company, Inc., Minneapolis

MONTANA
Missoula Mercantile Co., Missoula

MISSOURI
Bonne Terre Farming & Cattle Co., Bonne Terre
McNally Pump & Plumbing Supply Co., Hannibal
Hanna Rubber Company, Kansas City
Stowe Hardware & Supply Co., Kansas City
J. P. Bushnell Packing Supply Co., St. Louis
Missouri Belting Company, St. Louis
Schweitzer Brothers, Springfield

NEBRASKA
Central Supply & Rubber Company, Omaha

NEW HAMPSHIRE
Perkins, Bassett & Wright, Inc., Keene

NEW JERSEY
Industrial Rubber Co., Elizabeth
Smyth Rubber and Packing Co., Jersey City
Goodyear Rubber Products Corp., Newark
Phoenix Hardware Company, Newark
Passaic Rubber Products Co., Passaic
Burton Supply Co., Inc., Paterson
Ten Hoeve Brothers, Paterson
General Rubber Corp., Tenafly
James E. Lambert, Trenton

NEW MEXICO
Harry Cornelius Company, Albuquerque
Mine Supply, Inc., Silver City

NEW YORK
Donald Billings, Inc., Bronx
L. H. Heberlein Inc., Brooklyn
Greschler's, Brooklyn
William Goldenblum & Co., Brooklyn
Superior Oil and Belting, Brooklyn
A. N. Nelson, Inc., Brooklyn
Progressive Floor Covering Corp., Brooklyn
Buffalo Rubber & Supply, Inc., Buffalo
LeValley-McLeod, Inc., Elmira
Turcotte Mill Supply Company, Jamestown
American Grass Equipment Sales Corp., New York City
Banner Hose & Rubber Co., Inc., New York City
I. Beck & Sons, New York City
Wm. L. Blumberg Co., Inc., New York City
The Darcoid Company, Inc., New York City
The Durst Manufacturing Company, Inc., New York City
Gerard Packing and Belting Co., New York City
Goodyear Sundries and Mechanical Co., Inc., New York City
Greater New York Carpet House, Inc., New York City
C. D. Greenbaum Co., Inc., New York City
Griffin Engineering Corp., New York City
Herman Kornahrens, Inc., New York City
Loring Lane Co., New York City
Mahoney-Clarke, Inc., New York City
Miller Products Co., Inc., New York City
H. I. Murray & Co., New York City
The Safety Fire Extinguisher Co., New York City
Sickels Loder, Inc., New York City
Stewart Dickson & Co., New York City
Louis E. Strong Packing Company, Inc., New York City
William Summer Belting Co., New York City
United Rubber Supply Co., New York City
O. C. & K. R. Wilson, Inc., New York City
O. W. Jackson & Co., Inc., New York City
Bonner & Barnewall, Inc., New York City
Central Rubber Products Co., Inc., New York City
Globe Hardware Co., New York City
Excelsior Belting Company, New York City
Hulbert Bros., Inc., Plattsburg

NEW YORK (LONG ISLAND)
Complete Machinery & Equipment Co., Inc., Long Island City
Empire State Hardware and Supply Corp., Long Island City
Lester & Co., Newgarden
Local Steel and Supply Co., Inc., Mineola
Alcan Machinery and Equipment Co., Inc., Corona

NORTH CAROLINA
Southern Rubber Company, Greensboro
Machine & Supply Co., Inc., Morehead City
Craven Foundry & Machine Co., New Bern
Central Supply Company, Raleigh
Carolina Machinery & Supply, Rocky Mount
Shelby Supply Company, Shelby
Mill & Contractors Supply Co., Wilmington

OHIO
The Queen City Supply Co., Cincinnati
The W. H. Summers Company, Cleveland
The Hardy & Dischinger Company, Toledo

OKLAHOMA
Talbot Rubber Company, Oklahoma City
The Happy Company, Tulsa

OREGON
Goodyear Rubber & Asbestos Co., Portland

PENNSYLVANIA
W. A. Tydeman & Son, Inc., Easton
Industrial Motor Supply, Harrisburg
Morton Mill Supply Company, Kingston
Harold E. Smith, Lancaster
Hercules Hose & Rubber Co., Philadelphia
Stockwell Rubber Company, Philadelphia
Boston Woven Hose & Rubber Co. of Pittsburgh, Pittsburgh

RHODE ISLAND
Read & Lundy, Inc., Providence

SOUTH CAROLINA
Thackston-Davis Supply Co., Inc., Columbia
Poe Hardware Company, Greenville

TENNESSEE
Rogers Bailey Supply Co., Chattanooga
Browning Belting & Supply Co., Knoxville
Memphis Rubber & Supply Co., Memphis
Nashville Machine & Supply Co., Nashville

TEXAS
Abilene Electric Company, Abilene
Dallas Pump Service, Dallas
Shovel Supply Co., Dallas
Texas Rubber Supply, Inc., Dallas
El Paso Saw & Belting Supply Co., El Paso
General Industrial Supply Corp., Fort Worth
Peden Iron & Steel Company, Houston
M. B. McKee Company, Lubbock
D. E. Shipp Belting Company, Waco

UTAH
Flinco, Inc., Salt Lake City

VERMONT
Reed Supply Company, St. Johnsbury

VIRGINIA
Ferebee, Johnson, Co., Inc., Lynchburg
The Henry Walke Co., Norfolk
Norton Hardware Company, Norton
Southern Railway Supply Co., Richmond
Parker-Nimmo Supply Co., Inc., Salem

WASHINGTON
Steam Supply & Rubber Company, Seattle
Towne Equipment Company, Spokane

WEST VIRGINIA
Anchor Sales Company, Beckley
Bluefield Supply Company, Bluefield
Rish Equipment Company, Bluefield
Baldwin Supply Company, Charleston

WISCONSIN
Industrial Supplies Corporation, Appleton
E. Garnich & Sons Hardware Co., Ashland
The General Rubber Company, Milwaukee

THE BOSTON MAN
IN 1880

THE BOSTON MAN'S BUSINESS: rubber products engineered to your job

Fast-Moving Boston Research Gives You Better Industrial Rubber Products!

The Boston Man has solved problems in many instances almost identical with one that may be costing you money.

If your company uses industrial rubber goods of any type—from V-belts to mighty river-spanning conveyor belts, slender tubing to giant steel-reinforced suction hose—it will pay you to do business with Boston's specialists. Behind every Boston product stands a background of research unsurpassed in the industry. And if your needs are out of the ordinary, Boston's staff of scientists, engineers and designers stand ready to meet your most exacting requirements.

Why not bring your problems to one of the world's largest specialists in the manufacture of mechanical rubber goods. See our distributor in your area. He is your "Boston Man."

BOSTON

BWH

BOSTON WOVEN HOSE & RUBBER CO., Box 1071, Boston 3, Mass.

Industrial Hose • Belting • V-Belts • Packing • Tubing • Garden Hose • Tape • Matting

"I always choose my Primacord as carefully as I use it . . .

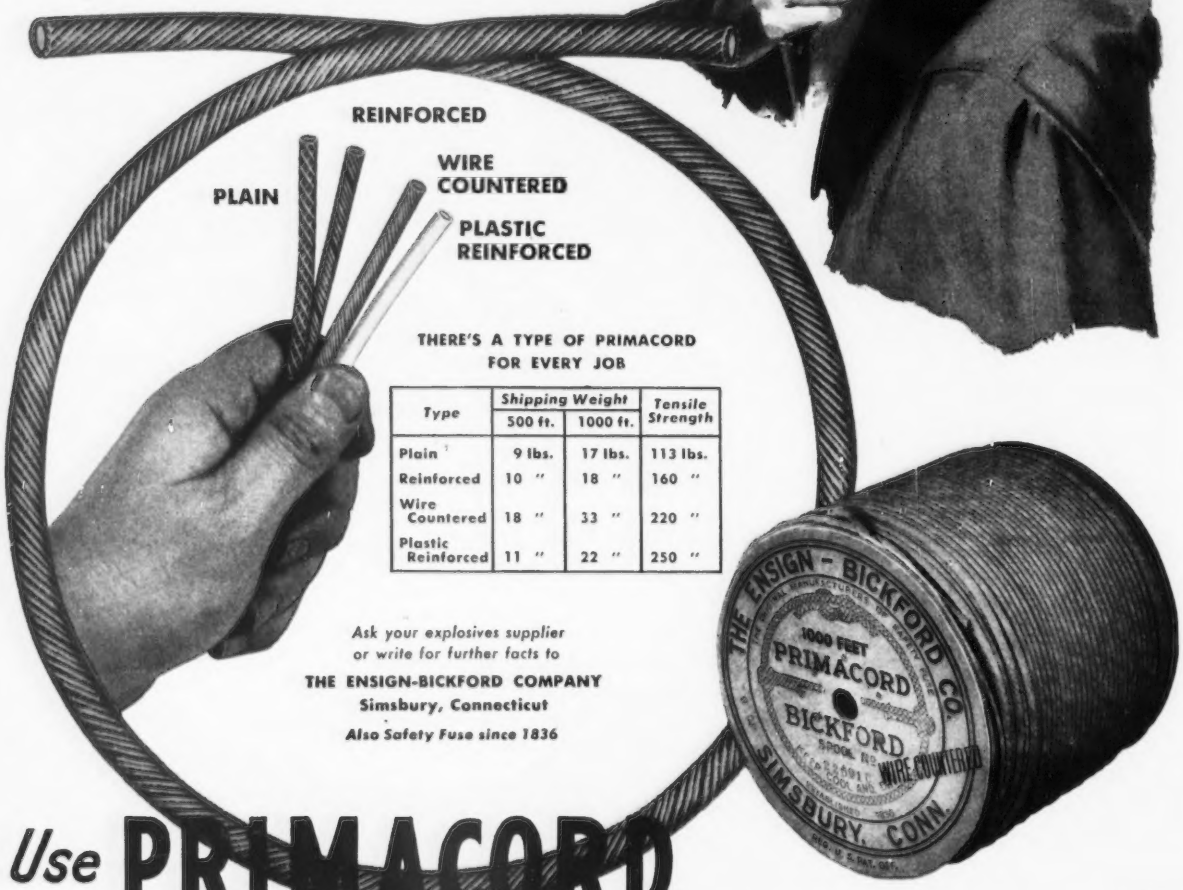
"I've used Primacord to shoot over-burden, ore, rock – and to ditch and clear right-of-way all-over the country. I get good results every time because I choose my Primacord as carefully as I use it.

"Plain Primacord I put down in small-bore or shallow holes, and also use it for the trunk line to hook them up. It's strong, light in weight, and economical. It's easy to tie tight to make a good connection.

"Reinforced Primacord is good insurance where I'm loading deep holes. It'll carry more weight and has a tougher cover to resist abrasion and cutting.

"Wire Countered Primacord is bound with fine wire. I always use it if I think there's any danger of sharp rocks or heavily reinforced explosives containers cutting the Primacord.

"Plastic Reinforced Primacord has a tough, waterproof plastic cover. I've used it in river crossings, in deep holes, or where field shots must stand a long time before blasting. It will take a lot of punishment, and is not affected by high summer heat or winter cold."



THERE'S A TYPE OF PRIMACORD FOR EVERY JOB

Type	Shipping Weight 500 ft.	Shipping Weight 1000 ft.	Tensile Strength
Plain	9 lbs.	17 lbs.	113 lbs.
Reinforced	10 "	18 "	160 "
Wire Countered	18 "	33 "	220 "
Plastic Reinforced	11 "	22 "	250 "

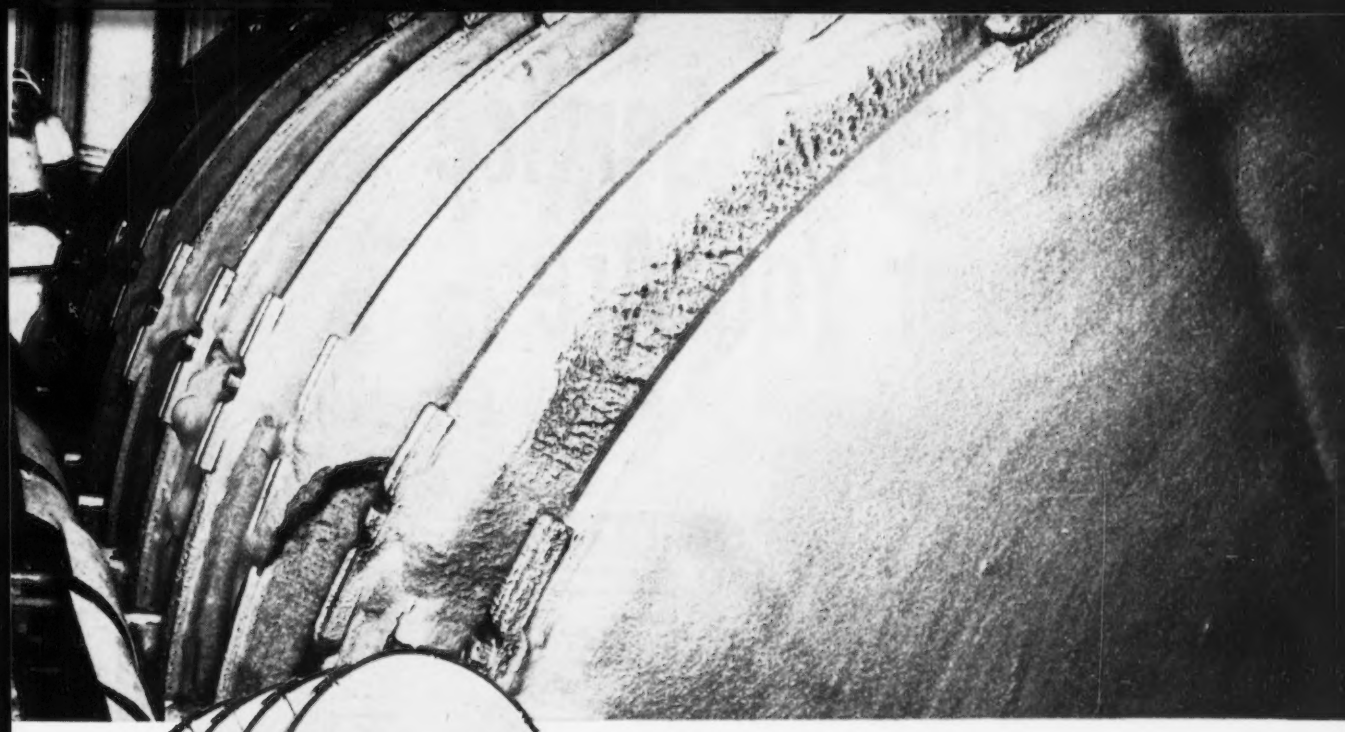
Ask your explosives supplier or write for further facts to

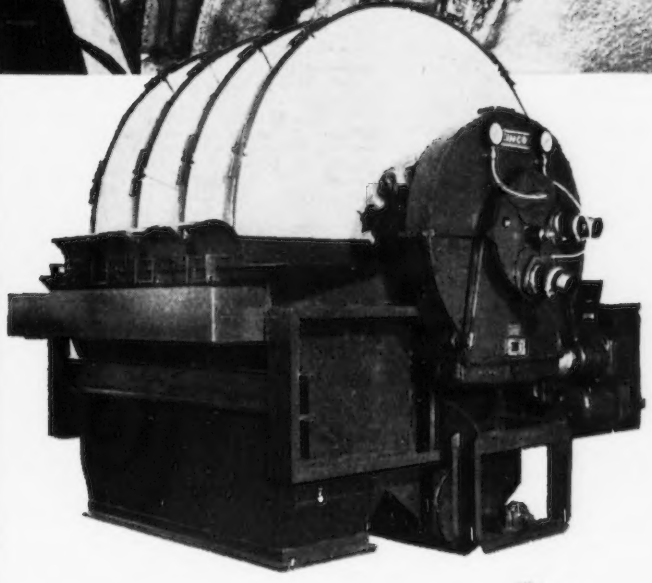
THE ENSIGN-BICKFORD COMPANY
Simsbury, Connecticut
Also Safety Fuse since 1836

Use PRIMACORD®

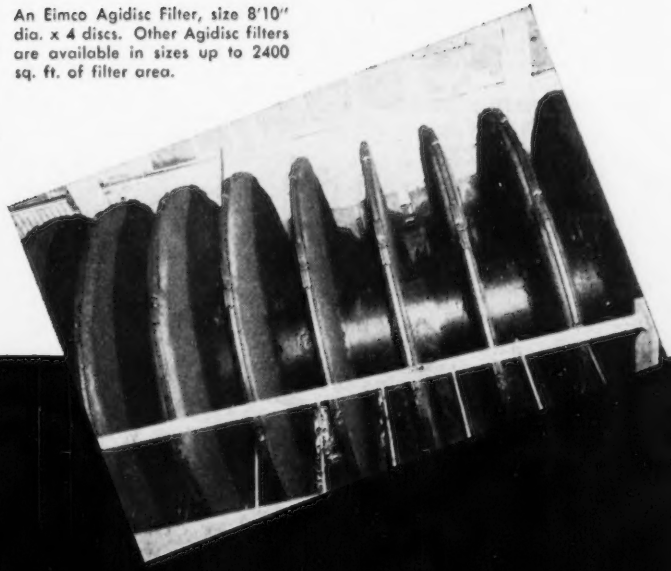
P-1

The PROVED and APPROVED DETONATING FUSE





An Eimco Agidisc Filter, size 8'10" dia. x 4 discs. Other Agidisc filters are available in sizes up to 2400 sq. ft. of filter area.



Eimco Agidisc Filters for Metallurgical Plants

Step up production in the mill by using more effective Eimco Agidisc filters in the dewatering of metallurgical slurries.

Eimco filters are carefully designed, heavy-duty production filters. In actual operation these units will produce more cake with lower moisture content than any other filter on the market of their type and size. Eimco Agidisc filters will also reduce your filter bag costs.

Here are some typical comparative results—In one plant an Eimco Agidisc filter was installed next to an ordinary disc filter, both operating at the same time on the same feed. The concentrate dewatered on the Agidisc contained 1½%-2% less moisture and tonnage dewatered on the Eimco Agidisc was 20% greater than on the ordinary disc filter.

EIMCO

THE EIMCO CORPORATION

The World's Leading Manufacturer of Vacuum Filtration Equipment

EXECUTIVE OFFICES AND FACTORIES — SALT LAKE CITY 10, UTAH, U. S. A.

BRANCH SALES AND SERVICE OFFICES:

NEW YORK, 51-52 SOUTH STREET • CHICAGO, 3319 SOUTH WALLACE STREET •
BIRMINGHAM, ALA., 3140 FAYETTE AVE. • DULUTH, MINN., 216 E. SUPERIOR ST.
EL PASO, TEXAS, MILLS BUILDING • BERKELEY, CALIF., 637 CEDAR STREET
KELLOGG, IDAHO, 307 DIVISION ST. • LONDON W. 1, ENGLAND, 190 PICCADILLY

IN FRANCE: SOCIETE EIMCO, PARIS, FRANCE
IN ENGLAND: EIMCO (GREAT BRITAIN) LTD., LEEDS 12, ENGLAND
IN ITALY: EIMCO ITALIA, S.P.A., MILAN, ITALY

Motor Repair Service Wherever You Are

ALLIS-CHALMERS "Certified" SERVICE

Factory approved motor service in every industrial area from 101 Allis-Chalmers Certified Service Shops.

ALABAMA
Birmingham—Elec. Repair & Serv. Co.
Greenville—Mawbray Eng. Co.
Montgomery—Standard Electric Co.

ARIZONA
Bisbee—Copper Electric Co. Inc.
Phoenix—Daley Electric Company

CALIFORNIA
San Diego—Calif. Elec. Works
Los Angeles—Larsen-Hogue Elec. Co.
Oakland—Pacific Elec. Motor Co.
T. L. Rosenberg Co.
San Francisco—Weidenthal-Gostiner Electric Works

COLORADO
Denver—Baker Electric Company

CONNECTICUT
Hartford—Charles H. Leppert
Waterbury—Elec. Motor Repair Co., Inc.

FLORIDA
Jacksonville—Turner Electric Works
Miami—Peninsular Armature Works
Tampa—Tampa Armature Works, Inc.

GEORGIA
Albany—Georgia Electric Co.
Atlanta—Bearden-Thompson Elec. Co.
Columbus—Smith-Gray Electric Co.

ILLINOIS
Chicago—Chicago Electric Co.
Marion—Giles Arm. & Elec. Wks., Inc.
Mt. Vernon—Dowzer Electric Machinery Works, Inc.

INDIANA
Indianapolis—Scherer Electric Co., Inc.
Evansville—Evansville Elec. & Mfg. Co.

IOWA
Sioux City—Smith Elec. & Supply Co.

KANSAS
Salina—Cent. Kans. Elec. Mach. Co.
Wichita—Tarrant Electric Mach. Co.

LOUISIANA
New Orleans—Industrial Elec., Inc.
Shreveport—Shreveport Armature & Electric Works

MAINE
Brewer—Stanley J. Leen Co.

MARYLAND
Baltimore—Keystone Electric Co., Inc.

MASSACHUSETTS
Lawrence—Roland B. Glines Co.
Springfield—Elec. Motor Repair Co.

MICHIGAN
Detroit—Stecker Electric Company
Grand-Rapids—Grand Rapids Industrial Electric Co.
Saginaw—Banning Elect. Prod. Corp.

MINNESOTA
Duluth—Mielke Electric Works, Inc.
Minneapolis—Parsons Elec. Co.

MISSISSIPPI
Vicksburg—Ludke Electric Co., Inc.

MISSOURI
Kansas City—Boese-Hilburn Elec. Co.
St. Louis—French-Gerleman Elec. Co.
Springfield—Springfield Elec. Serv. Co.

NEBRASKA
Omaha—Omaha Electrical Works

NEW HAMPSHIRE
Concord—A. S. Tracy

NEW JERSEY
Atlantic City—Charles A. Buckley
Paterson—Elec. Service Repair Co.
Trenton—Lockwood Elec. Motor Serv.

NEW MEXICO
Albuquerque—Electric Motor Company
Powell Electric Co.

NEW YORK
Buffalo—Robertson Electric Co.
Volland Elec. Equip. Co., Inc.
Flushing—Flushing Elec. Corp.
Jamestown—A. E. Westburgh
Mt. Vernon—H. A. Schreck, Inc.
New York—Consol. Elec. Motor Co.
Rochester—Vanderlinde Elec. Corp.
Utica—Mather, Evans & Diehl Co.
Watertown—Watertown Elec., Inc.

NORTH CAROLINA
Charlotte—Southern Elec. Service Co.
Greensboro—Southern Elec. Serv. Co.
Rocky Mount—Hammond Elec. Co.

OHIO
Cincinnati—Cincinnati Elec. Equip. Electric Service Co.
Akron—A-C Supply Co.
Toledo—Romanoff Elec. Motor Serv.
Youngstown—Winkle Electric Co.

OKLAHOMA
Miami—Miami Armature Works
Oklahoma City—Southwest Elec. Co.
Tulsa—Smith-Milligan Electric Co.

OREGON
Eugene—Kalen Electric & Mach. Co.
Portland—Milwaukee Mach. Co.

PENNSYLVANIA
Johnstown—Universal Elec. Mfg. Co.
Osceola Mills—Mid-State Elec. Eng. Co.
Philadelphia—Elec. App. & Repair Co.
Pittsburgh—Penn. Elec. Coil Corp.
York—Industrial Electric Company

SOUTH CAROLINA
Greenville—Southern Elec. Serv. Co.
Spartanburg—Southern Elec. Serv. Co.

SOUTH DAKOTA
Sioux Falls—Electric Motor Repair

TENNESSEE
Columbia—Middle Tenn. Arm. Wks.
LaFollette—Standard Arm. Works, Inc.
Memphis—Indus. Elec. & Supply Co.

TEXAS
Amarillo—G. E. Jones Elec. Co.
Beaumont—Elec. Mach. & Repair Co.
Dallas—Industrial Elec. Equipment Co.
El Paso—B & M Machinery Co.
Fort Worth—Central Electric Co.
Houston—Roy A. Berentz Co.
Sweetwater—Sweetwater Electric Co.

UTAH
Salt Lake City—Diamond Electric Motor Repair

VIRGINIA
Richmond—Wingfield & Hundley
Roanoke—Virginia Armature Co.

WASHINGTON
Spokane—Lee F. Austin Company

WEST VIRGINIA
Charleston—Charleston Elec. Supply
Fairmont—West Virginia Armature Co. of Fairmont, Inc.
Morgantown—Galis Elec. Repair Co.

WISCONSIN
Baraboo—Utility Trans. & Equip. Co.
Green Bay—Beemster Electric Co.
Milwaukee—Dietz Electric Co.
Wausau—Electric Motor Service
Wisconsin Rapids—Staub's Elec. Wks.

ALLIS-CHALMERS CERTIFIED SERVICE SHOPS are independent service shops which have met rigid standards for ability, experience, equipment and business integrity. They use factory approved methods and parts and do your work promptly at a fair price.

Of course, Allis-Chalmers Certified Service Shops give good service on any electrical equipment, of any make. Tear out this ad and save it, or write the name of the A-C Certified Service Shop nearest you in your address book. Allis-Chalmers, Milwaukee 1, Wisconsin. A-4197

Texrope and *Vari-Pitch* are Allis-Chalmers trademarks.

ALLIS-CHALMERS

Sold . . .
Applied . . .
Serviced . . .

by Allis-Chalmers Authorized Distributors, Certified Service Shops and Sales Offices throughout the country.

CONTROL — Manual, magnetic and combination starters; push button stations and components for complete control systems.

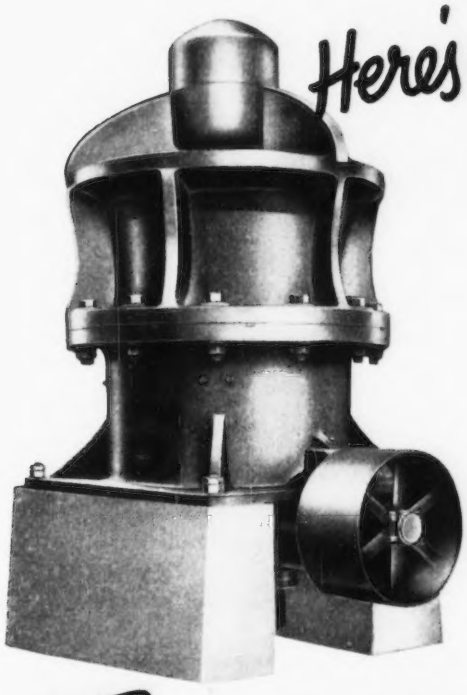
TEXROPE — Belts in all sizes and sections, standard and *Vari-Pitch* sheaves, speed changers.

PUMPS — Integral types from ¾ in. to 72 in. discharge and up.

You Get... PRODUCTION AT A PROFIT

with TRAYLOR TY Reduction Crushers

Here's why...



More than 806 operators all over the world can vouch for superior operating efficiency of a Traylor TY. Over half a century of engineering skill is back of every Traylor TY Reduction Crusher. The result is a compact secondary crusher, simple in design, into which is built a maximum of strength. Highly efficient, Traylor TY Crushers require minimum floor space and little head room. Check the following features that combine high production, economy of operation and lower maintenance costs into *one* great crusher . . . the "Traylor-Made" TY.

- Cast steel frame, upper shell and spider of one piece
- Traylor original, non-chokable, self-tightening bell head and curved concaves, made of manganese steel
- Traylor patented dust seal, excludes dust and grit from the lubricating chamber
- Positive, automatic force-feed lubrication system, with water-cooled oil reservoir
- Machine-cut steel gearing
- Self-contained countershaft bearing, fitted with roller bearings and automatically lubricated
- All-around bottom discharge, without diaphragm

Traylor TY REDUCTION CRUSHER

TRAYLOR ENGINEERING & MANUFACTURING CO.
1572 MILL ST., ALLENTOWN, PA.

Send me your Bulletin 7112 on Traylor TY Reduction Crushers.

Name: _____

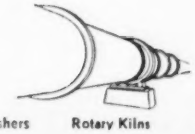
Position: _____

Company: _____

Address: _____ *State:* _____

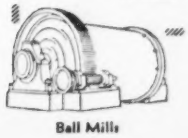
Sales Offices: New York • Chicago • San Francisco
Canadian Mfrs: Canadian Vickers, Ltd., Montreal, P.Q.

Primary Gyratory Crushers

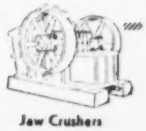


Rotary Kilns

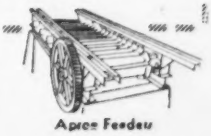
Secondary Gyratory Crushers



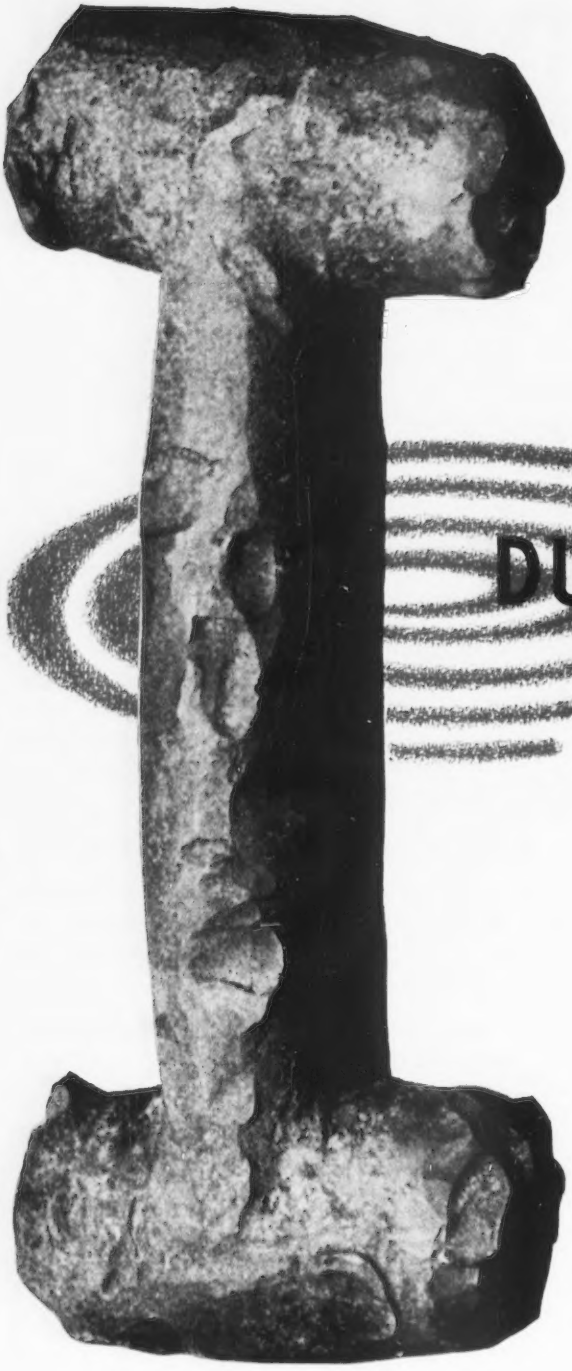
Ball Mills



Jaw Crushers



Apron Feeder



DUMB-BELL?...

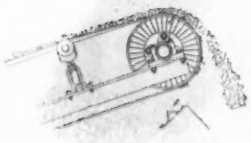
ACTUAL SIZE

. . . NO,

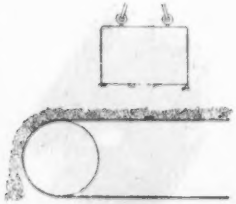
it's a big 8-inch hunk of iron that found its way into a crusher. Its scarred surface tells a sad story about that crusher and its unhappy owners who learned how economical an investment a magnet can be . . . the hard way.

Preparation plants that don't magnetically protect their crushers, belts and other equipment ought to compare the cost of tramp iron trouble with that of adequate magnetic protection.

And if your old magnets aren't doing the job, learn about the new, improved types available. *Write Dings today for* CATALOG C-5000-B.



Dings Magnetic pulley installed as head drive pulley on conveyor belt. Iron separated, discharged automatically.



Dings Rectangular Suspended Magnets pull iron out of deepest burdens, fastest moving conveyor belts.

RS153

Dings

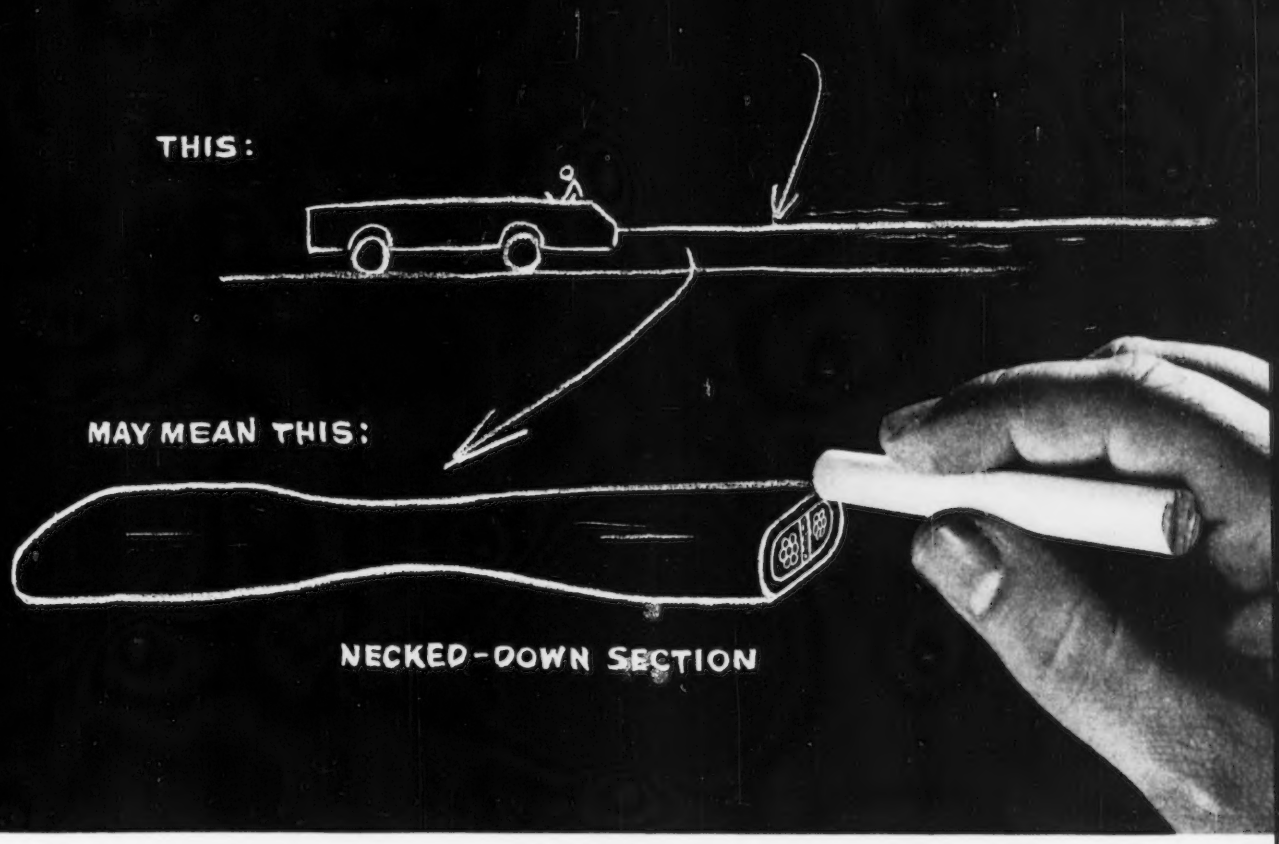
MAGNETIC SEPARATOR COMPANY

4716 W. Electric Ave., Milwaukee 46, Wisconsin

Magnetic Separation Leader for over Fifty Years

MINING MACHINE CABLE

HOW TO SPOT DAMAGE FROM TOO MUCH TENSION



. . . AND WHY ANACONDA'S NEW BALANCED DESIGN ADDS SAFETY, LONGER LIFE TO CABLE

Necked-down cable shows overstretching. Jacket and insulation become thin, easily punctured. Moisture penetration or a broken ground conductor may make the cable hazardous.

ANACONDA'S ANSWER: BALANCED DESIGN

Tension devices help; but aren't cure-alls. An added safeguard lies in the balanced design of Anaconda's new mining-machine cable. Stretchability of the ground has been increased. It will not break before the power conductors. A new neoprene jacket has higher compression-cutting resistance and tensile strength. In the insulation more strength and moisture resistance are obtained from a cold-rubber base . . . similar to that used by tire makers to mold a tougher tire. Stranding, too, has been redesigned to make the whole cable more flexible . . . at no greater cost. You get less trouble from tearing, cutting, gouging and abrasion caused by rib-pinching, runovers and dragging.

MUCH LONGER AVERAGE LIFE

In shuttle cars recently surveyed in 15 mines, ANACONDA Cables last 3 times as long as cables made only a few years ago. To learn why this is so, ask your nearest Anaconda Sales Office or Distributor for a sample section of this new cable. Examine it . . . take it apart. And remember that no ANACONDA Mine Cable has ever failed a U. S. Bureau of Mines flame test. *Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.*

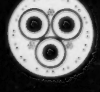
53200

ANACONDA®

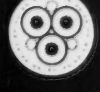
TODAY'S HEADQUARTERS FOR MINE CABLE

FLAT-TWIN CABLES FOR:
shuttle cars
continuous miners
loaders cutters
drill trucks

HI-VOLT CABLES FOR:
mine power



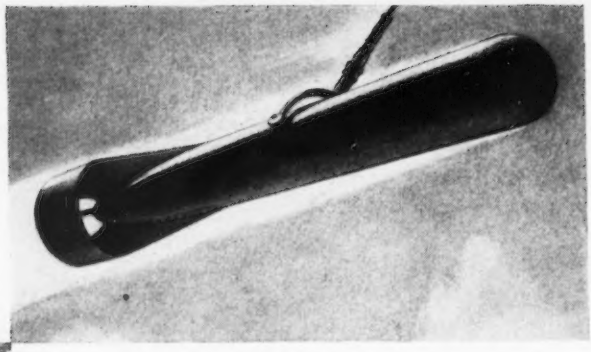
TYPE SH-D FOR:
shovels

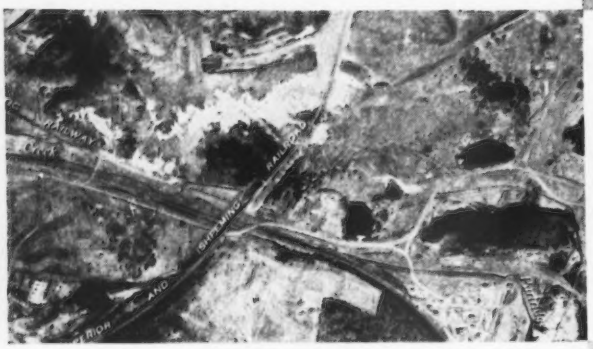


TYPE SO FOR:
hand drills
remote control

TROLLEY WIRE
FEEDER CABLES
TELEPHONE WIRE
SHOT FIRE CORD
WELDING CABLES

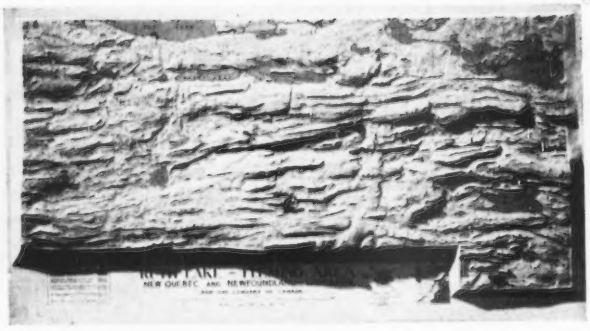
Important mineral finds are being uncovered by Aero clients with the airborne magnetometer





Precise aerial mosiacs provide valuable reconnaissance and planning data

Accurate Aero topographic maps aid engineering development



Light weight, plastic relief models give Aero maps a 3rd dimension for management

AERO's modern mining tools are cutting exploration and mapping costs . . . helping to locate new deposits of magnetite, ilmenite, nickel and asbestos . . . and putting schedules months and even years ahead. AERO maps are delivered speedily, and are so accurate, mining engineers are using them for plotting boreholes, property lines, rail spurs, access roads, power lines, and other phases of planning and development. Call on 34 years' experience of AERO—pioneer and leader in aerial surveys.

AERO SERVICE CORPORATION
PHILADELPHIA 20, PA.
Oldest Flying Corporation in the World

THESE REPOINTERS ARE *wear-conditioned*

Because they are AMSCO "Wear-Sharp"* Repointers that stay sharper with use...

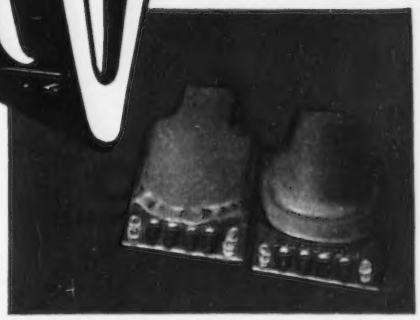
Service life plus! The combination of Amsco Manganese Steel and the hardness of AMSCOATING with Amsco Hardfacing electrodes—gives you a tooth that wears evenly and stays sharp longer.

Note that only certain grooves (shown in red at left) are Amscoated—the grooves on the outside and the one on each end. This is the area where ordinary teeth wear fastest. The hardened corners on the "Wear-Sharp" equalize wear along the entire cutting edge and eliminate rounded, blunted corners that cut digging speed and waste power.

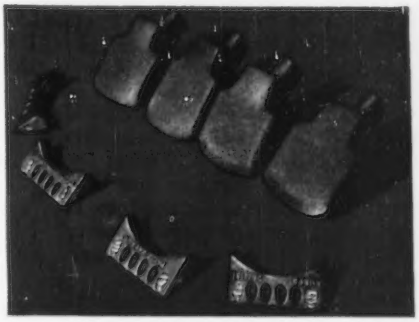
Field reports indicate that "Wear-Sharp" repointers will give as high as six times the life of other teeth.

In these photographs at right of a typical case history, old repointers lasted from three to four days. Amsco "Wear-Sharp" repointers lasted 32 days—eight times the service life of the repointers previously used.

* U. S. Pat. No. 2,247,202



"Wear-Sharp" repointers installed on two dipper teeth showing condition of old teeth.



Notice the even wear on these teeth after 257 hours of use with "Wear-Sharp" repointers used. New "Wear-Sharps" are ready for installation.

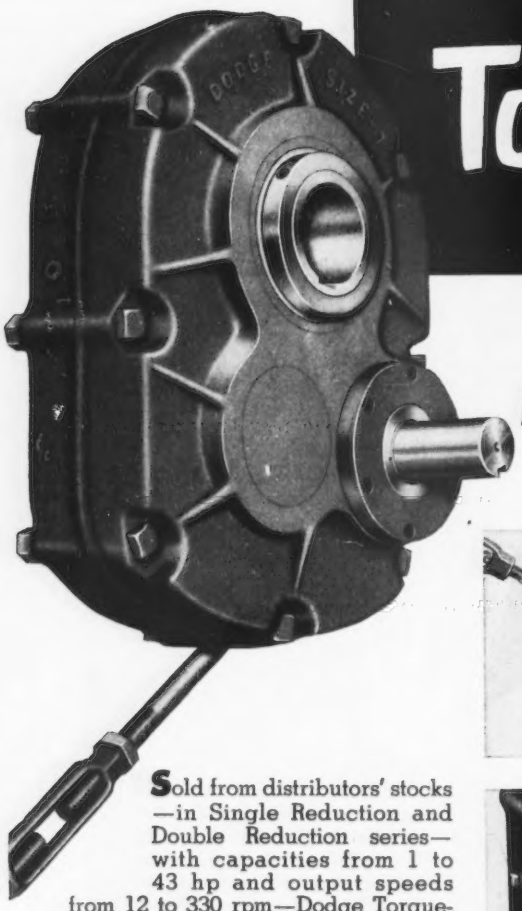
AMERICAN Brake Shoe COMPANY

AMERICAN MANGANESE STEEL DIVISION

376 EAST 14th STREET · CHICAGO HEIGHTS, ILL.

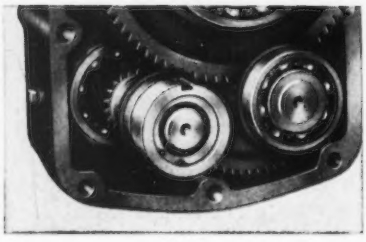
Other Plants: New Castle, Del., Denver, Oakland, Cal., Los Angeles, St. Louis. In Canada: Joliette Steel Division, Joliette, Que.
Amsco Welding Products distributed in Canada by Canadian Liquid Air Co., Ltd.

Torque-Arm



The Most Complete Line of Shaft-Mounted Speed Reducers!

TRI-MATIC OVERLOAD RELEASE
Provides instant, positive protection for driven machines, motors and reducer itself. Automatically (1) loosens the belts, (2) cuts off power, (3) gives a warning.



TORQUE-ARM BACK STOP
Available from stock when required. Easily installed—sealed inside reducer housing. Simple, positive action prevents reversal.

Sold from distributors' stocks—in Single Reduction and Double Reduction series—with capacities from 1 to 43 hp and output speeds from 12 to 330 rpm—Dodge Torque-Arm is the new and modern idea in speed reducers.

No special engineering required. No foundation to provide. No flexible couplings. No sliding base. No lining up difficulties. No expensive installation. Stock Taper-Lock sheaves prescribed for each job to provide desired speeds. Application to other machines is practical and easy.

Unit is driven through any V-Belt Drive. Torque-Arm, fastened to any fixed object, anchors the reducer unit. Turnbuckle provides fast and accurate adjustment of belt tension.

Standardize on Torque-Arm, the speed reducer that saves you money.

DODGE MANUFACTURING CORPORATION
3100 UNION STREET, MISHAWAKA, INDIANA

DODGE
of Mishawaka, Ind.

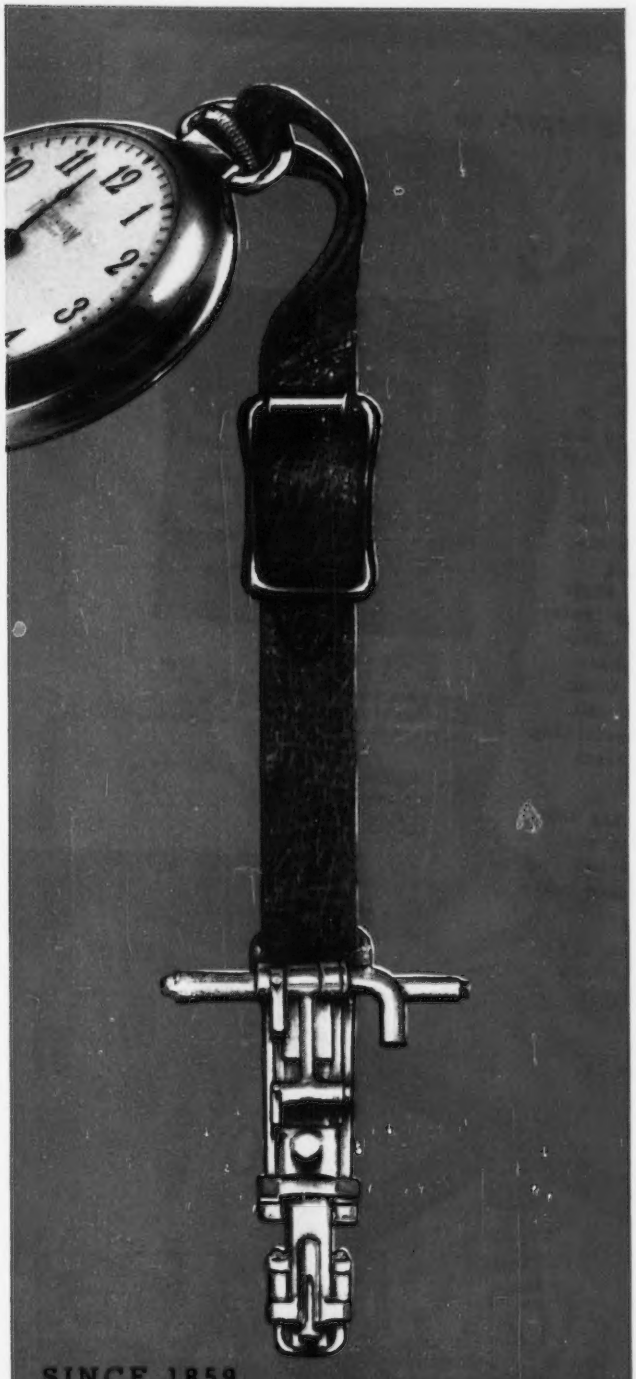
CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory-trained by Dodge, he can give you valuable assistance on new, cost-saving methods. Look for his name under "Power Transmission Machinery" in your classified telephone book.

1878 DODGE 1953 75th ANNIVERSARY

TAPER-LOCK SHEAVES, SEALED LIFE V-BELTS

DODGE-TIMKEN PILLOW BLOCKS

TAPER-LOCK FLEXIBLE COUPLINGS



mark of the HARD ROCK MINER

For many years, this handsome Gardner-Denver watch fob has been presented to miners.

In mines throughout the world, it has become the symbol of the "hard-rock man"—and a token of the esteem in which he holds Gardner-Denver equipment.

Gardner-Denver Company
Quincy, Illinois

SINCE 1859

GARDNER-DENVER

THE QUALITY LEADER IN PUMPS, COMPRESSORS AND ROCK DRILLS
FOR CONSTRUCTION, MINING, PETROLEUM AND GENERAL INDUSTRY

Elmhurst-Chicago Stone Company Report on
J&L Jalloy Heat-Treated Plate:

"Twice the Wear ... No Downtime During Quarrying Season"

Faced with the problem of finding a long-lasting lining for their high-speed rock-crusher chutes, Elmhurst-Chicago Stone Company tried everything from rubber to high-carbon steel. Then, in 1949, J&L Jalloy Heat-Treated Plate was experimentally installed in 15% of the company chutes.

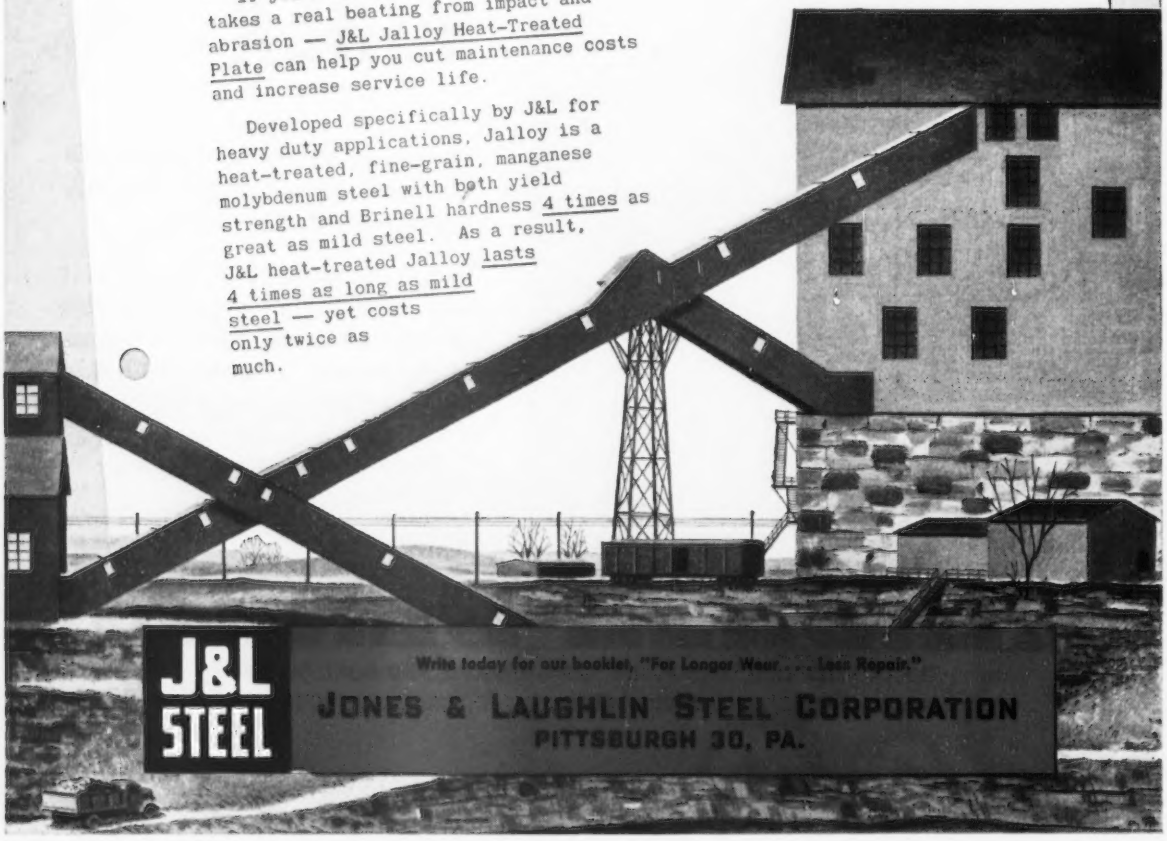
Today all worn out plates have been replaced with J&L Jalloy. Here's why. Jalloy lasted twice as long as the special abrasion-resistant steel chute liners previously used ... Jalloy lasted the entire quarrying season ... eliminated costly downtime for maintenance repairs. Finally, Elmhurst has taken further advantage of this modern J&L mining and quarrying steel by installing Jalloy liners in the company's truck beds.

If you have equipment like this that takes a real beating from impact and abrasion — J&L Jalloy Heat-Treated Plate can help you cut maintenance costs and increase service life.

Developed specifically by J&L for heavy duty applications, Jalloy is a heat-treated, fine-grain, manganese molybdenum steel with both yield strength and Brinell hardness 4 times as great as mild steel. As a result, J&L heat-treated Jalloy lasts 4 times as long as mild steel — yet costs only twice as much.

One of the roll crushers. Its high speed introduced tough impact and abrasion problems which have been solved with J&L Jalloy chute linings.

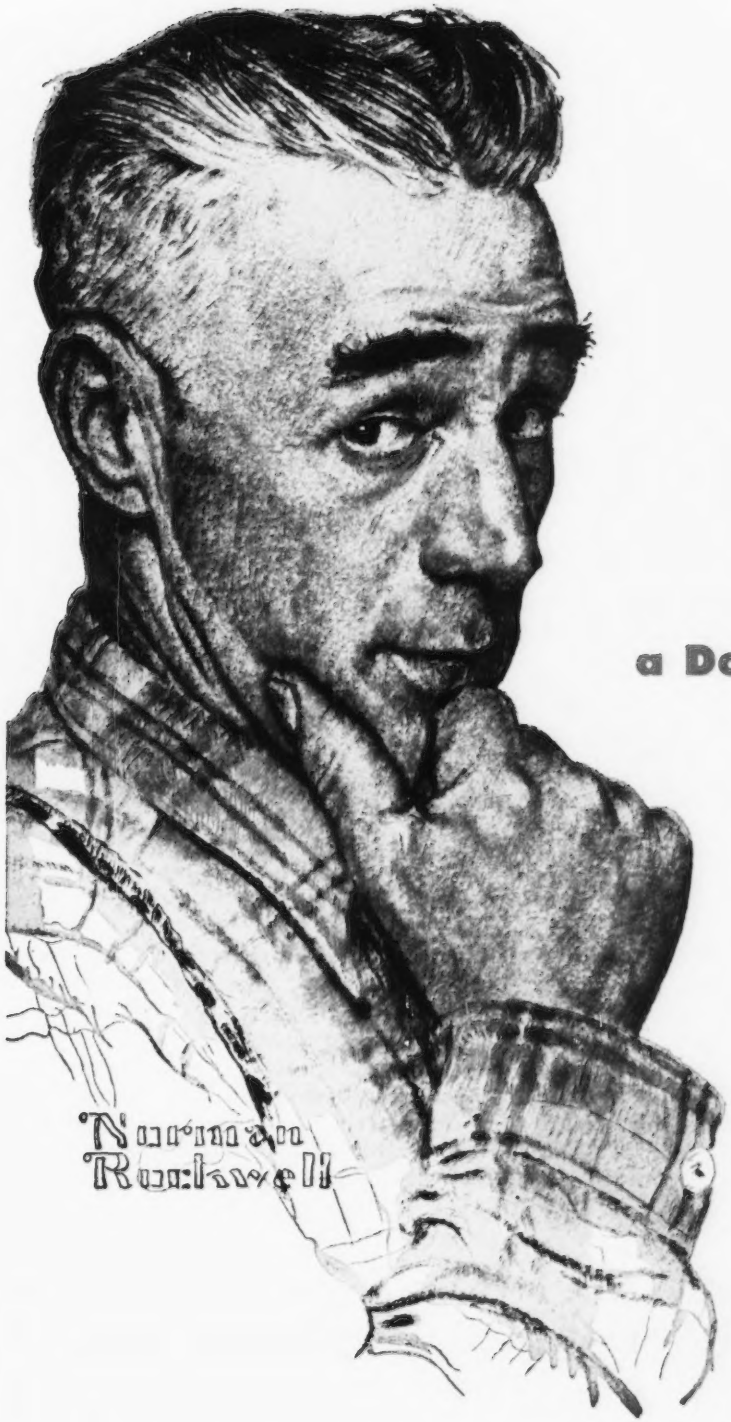
The 70-year-old quarry of Elmhurst-Chicago Stone Company.



J&L STEEL

Write today for our booklet, "For Longer Wear . . . Less Repair."

JONES & LAUGHLIN STEEL CORPORATION
PITTSBURGH 30, PA.



You?...

a Doubting Thomas?

IF YOU'RE a man who has to be shown, we're right in your corner. Just give Roebling "Blue Center" Steel Wire Rope one try . . . see for yourself how it saves time and costs you less on the job.

Two out of three wire rope users in the mining field prefer Roebling rope. Call your nearest Roebling office for a Field Man to suggest the best rope for your purposes.

ROEBLING CF&I

A subsidiary of The Colorado Fuel and Iron Corporation

JOHN A. ROEBLING'S SONS CORPORATION, TRENTON 2, N. J. BRANCHES: ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDONIA AVE. • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6215 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE TRENTON 2, N. J.

Homoflex Hose—More use per dollar

Homoflex Hose per dollar

Homoflex dollar

Hon er dollar

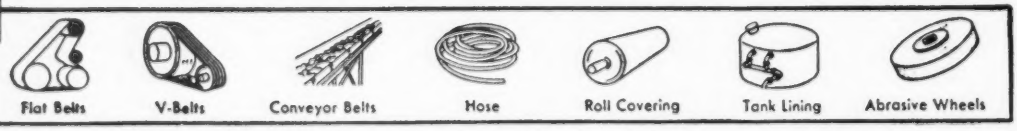
Homoflex Ho se per dollar

FLEXIBLE, LIGHT, BUT RUGGED AND STRONG . . . Yes, you save money because Homoflex lasts longer. It's easier to coil and uncoil . . . no pre-set twist . . . no kinking . . . easier to carry and drag. "Flexible as a Rope". Workmen like it. Cover and tube are inseparable and hosewall is strong and safe, for handling air, water, other fluids and gases. Ask the R/M distributor for Bulletin 6879. He'll tell you about other R/M hose types for steam, oil, suction, chemicals—from small 1/4" size, to huge dredging hose big enough for a man to crawl through . . . also how you get MORE USE PER DOLLAR with R/M transmission, and conveyor belt, and V-belts.

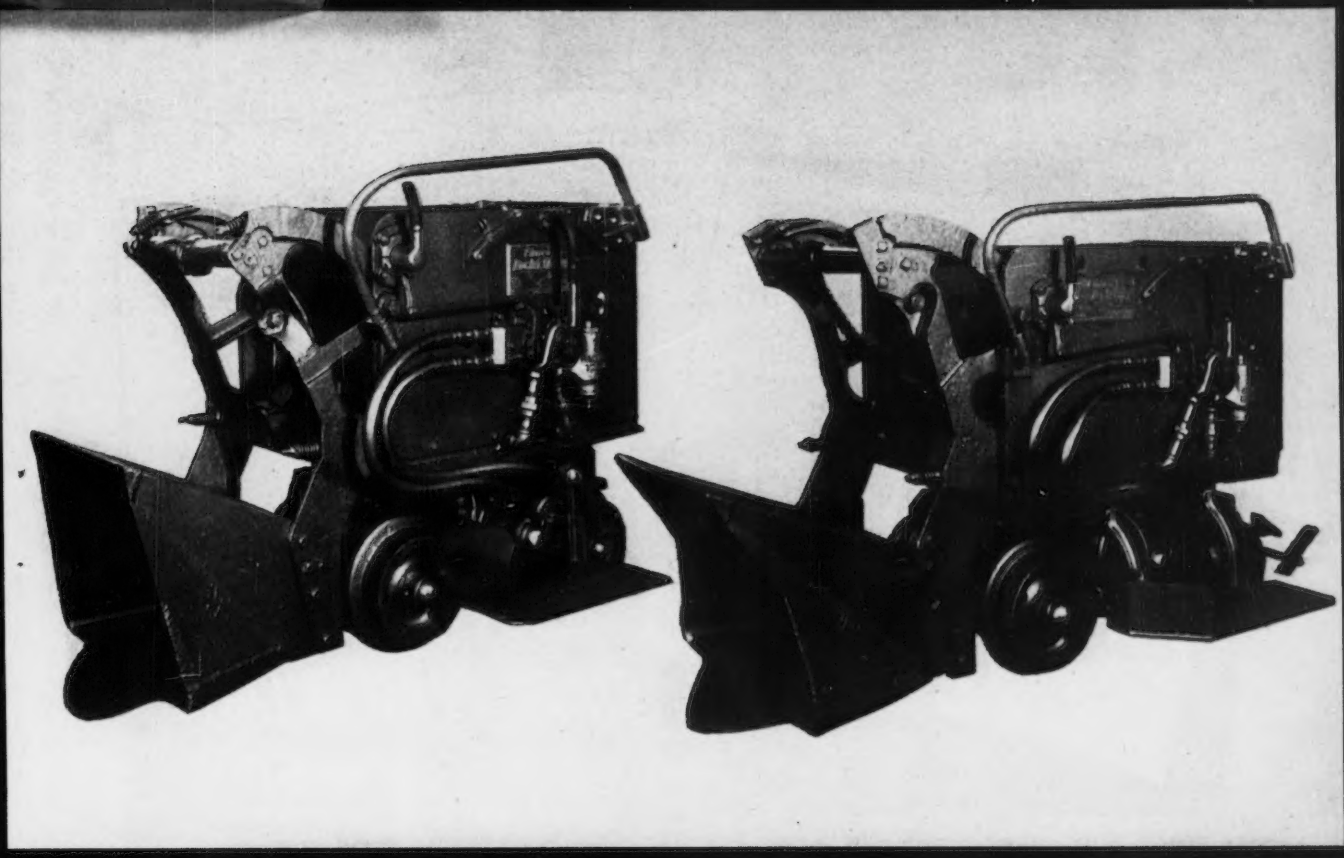
RM

MANHATTAN RUBBER DIVISION — PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.



Other R/M products include: Industrial Rubber • Fan Belts • Radiator Hose • Brake Linings • Brake Blocks • Clutch Facings
Asbestos Textiles • Teflon Products • Packings • Sintered Metal Parts • Bowling Balls



SPECIALIZED EQUIPMENT SAVES IN LOADING - GRINDING AND FILTRATION

The efficient operation of New Jersey Zinc through the years can be in part attributed to the exacting requirements of their management and supervisory personnel in the type of equipment purchased.

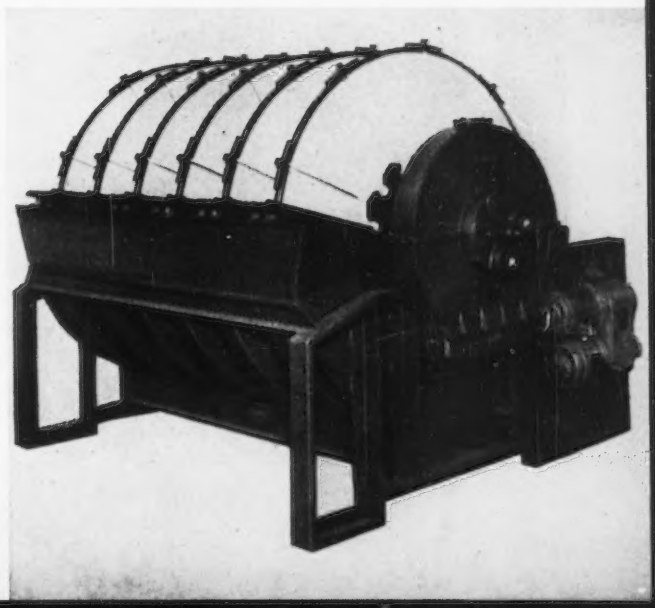
Their selection of Eimco equipment for many special jobs in all the various operations of this great company is indeed gratifying to us as producers of mining and processing equipment.

Their operations are using Eimco equipment that has been working steadily for 10 to 12 years and doing a good job because successful operations such as these will tolerate nothing else.

Eimco equipment in use for various purposes includes four models of Rocker Shovels used for exploration development and production mining. Mechanical loading in production mining as used in some of their properties is "old stuff" to New Jersey Zinc but is still comparatively new to the general mining public who still argue chutes and grizzlie versus mechanical loading from draw points. Eimco continuous disc type filters and ball mills form an important part in the flow sheet of several of the milling operations. These units were also scrutinized carefully for their efficient operation and have proven satisfactory.

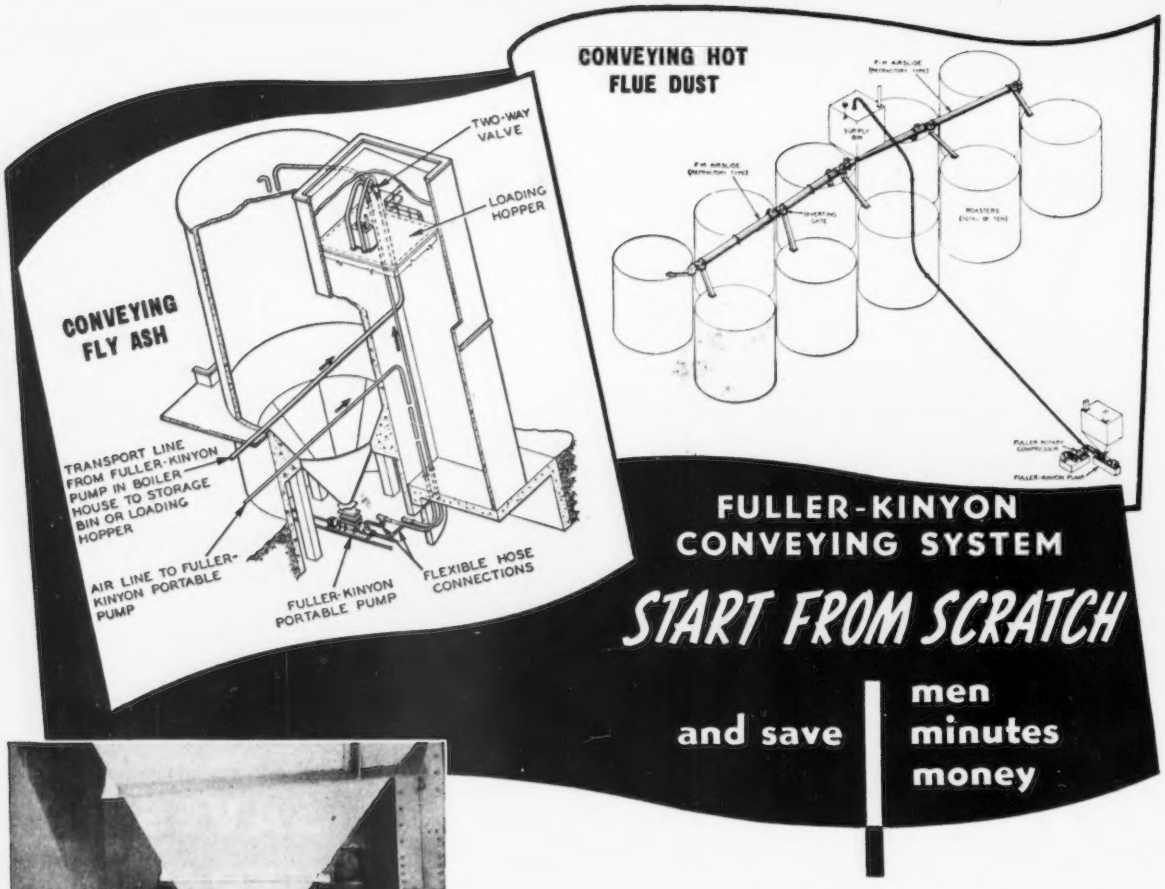
Other important mining operations across this country and indeed in every mining country of the world have found that Eimco equipment serves best where heavy-duty dependable service is desired.

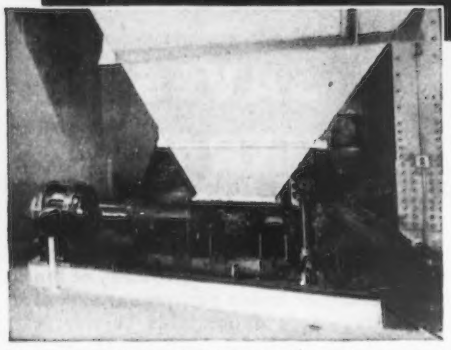
When you have a problem in loading or filtration, let Eimco Engineers help you—no obligation, of course.



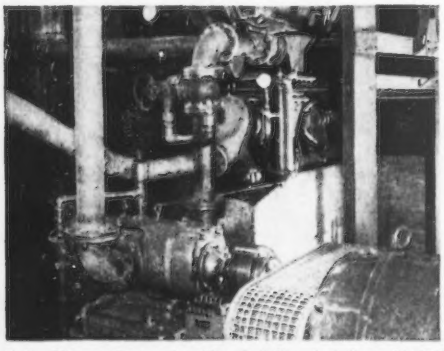
THE EIMCO CORPORATION
Salt Lake City, Utah, U.S.A.
Export Office, Eimco Bldg., 52 South St., New York City

A497





Fuller-Kinyon System handling fly ash in a large central-generating station, from boilers to storage, storage to loading hopper. See drawing upper left.



Fuller-Kinyon System handling hot flue dust from Cottrell precipitator collecting hoppers to supply bin. F-H Airslides convey and distribute uniformly to roasters. See drawing upper right.

The best way to solve any problem of conveying dry pulverized materials is to "Start from Scratch." Get all the facts on pneumatic conveying systems while you are still in the planning stage ... either when building a new plant or modernizing an old one. Pneumatic conveyors permit economy and convenience in location of buildings and production equipment without the restrictions or straight-line limitations of mechanical conveyors. The layout of the system can be designed to meet the specific requirements of the job, to conform exactly to local conditions, to insure minimum cost for erection, maintenance, and supervision.

Right there is where Fuller comes into the picture. As engineers and builders of four basic types of pneumatic conveying systems, Fuller is able to provide the exact system best suited to individual requirements. Shown are two Fuller-Kinyon Conveying Systems—one for handling fly ash from boilers, the other for hot flue dust from Cottrell precipitators.

Fuller-Kinyon Systems have many advantages: conveying lines can be located anywhere—underground; suspended on simple hangers overhead; vertically; around corners; over long distances; and to practically any number of delivery points. There are no mechanical or explosion hazards. Conveying is clean, fast, and at minimum cost per ton of material handled.

We invite you to have Fuller engineers make a study of your plant plans—investigate conditions and the material to be handled. Then they can make recommendations as to the system best adapted to your needs—enable you to save time, money, and material by having both plant and system built at the same time. To consult them places you under no obligation.

FULLER COMPANY—CATASAUQUA, PA.

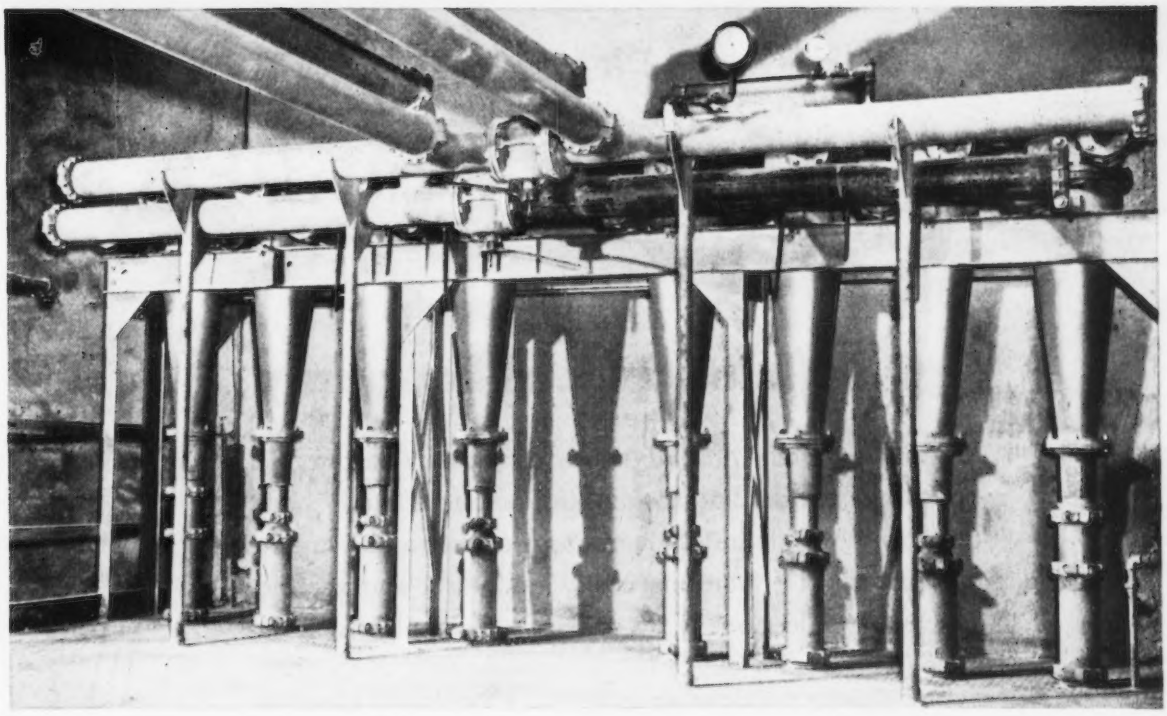
Branch offices

Chicago—San Francisco—Los Angeles—Seattle—Birmingham

Fuller

DRY MATERIAL CONVEYING SYSTEMS AND COOLERS — COMPRESSORS AND VACUUM PUMPS — FEEDERS, AND ASSOCIATED EQUIPMENT

P-149
2112



New Jersey Zinc Recovers High-Grade Agricultural Lime from Zinc-Lead Tailings with

Heyl & Patterson CYCLONE THICKENER

At the Austinville, Virginia plant of The New Jersey Zinc Company, seven 14″ Heyl & Patterson Cyclone Thickeners process as much as 1,750 gallons per minute of zinc-lead tailings in the preparation of high grade agricultural limestone.

The purpose of the Cyclones is to eliminate the extremely fine material which previously had balled together to form cement-like lumps that caused breakage of spreading equipment on the farm.

Besides the recovery of this high-grade lime, the installation of Heyl & Patterson Cyclones has the additional advantage of lightening the load on the tailing pond.

This installation illustrates the versatility of Heyl & Patterson Cyclones in solving thickening, classification and recovery problems of all kinds. The low-cost, proven H&P Cyclone Thickener could easily be the answer to your particular problem.

WRITE FOR BOOKLET CT-54 FOR COMPLETE INFORMATION

Cyclone Thickeners
Thermal Dryers
The Drying Dutchman
Reineveld Centrifugal Dryer
Thorsten Coal Sampling Systems
Rotary Mine Car Dumpers
Coal Crushers
Coal Preparation Plants
Bradford Breakers

Heyl+Patterson, Inc.
"SINCE 1887"
55 FORT PITT BLVD. PITTSBURGH 22, PA.

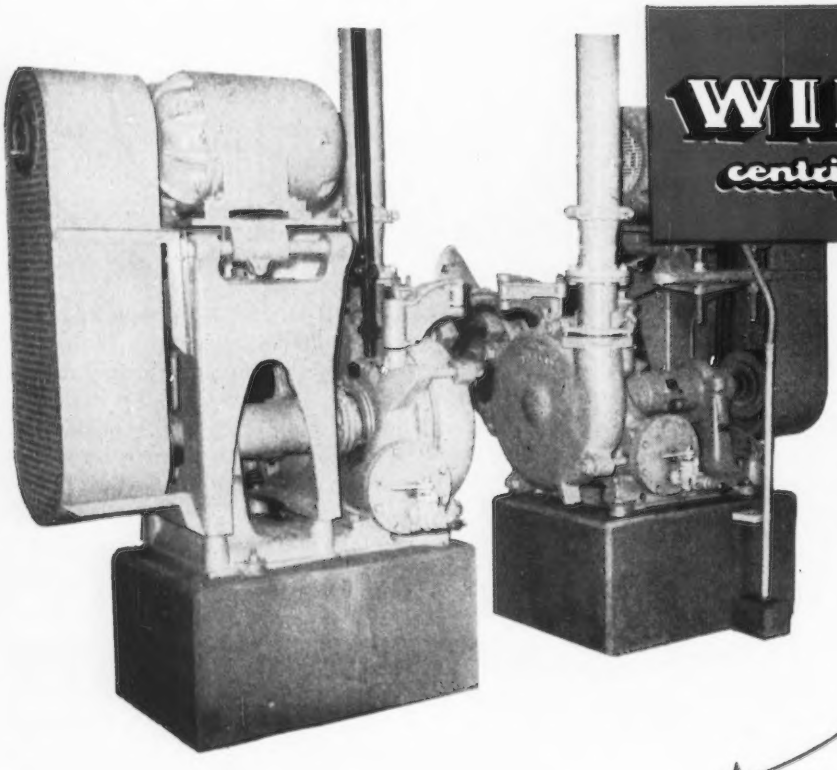
Greater Savings

through

High Efficiency and Economy

Wilfley Model K Sand Pumps meet every cost-saving requirement in handling sands, slurries and slimes. These famous pumps definitely increase production and create measurable savings in operating costs. Individual engineering on every application. Write or wire for complete details.

• Cost-saving efficiency • Stepped-up production • Continuous operation without attention • Minimum replacement of parts • Designed for simple installation • Economical pump size for every application



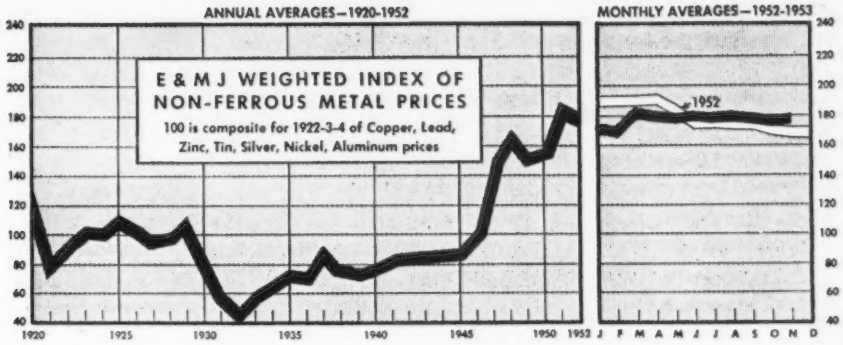
WILFLEY
centrifugal PUMPS

Companion to the famous WILFLEY Acid Pump

A. R. WILFLEY & SONS, Inc. • Denver, Colorado, U.S.A. • New York Office: 1775 Broadway, New York City

E&MJ OUTLOOK

PRICES



MARKETS

A modest rise in copper plus an about-face in tin inched the *E&MJ* index of nonferrous metal prices up to 180.45 for November from the October level of 180.05 (corrected). Lead and zinc were unchanged.

Covering by shorts aided improved buying for actual consumption to push the European market, mirrored by the London Metal Exchange, higher for the month. However, as November ended, there were fresh signs of price unsettlement abroad.

U. S. lead and zinc markets breathe easier, minus heavy selling pressure from foreign sources. Copper, still going strong, will likely ease off early next year, as Chile's output returns to market. Soaring aluminum output has some producers wondering if it's all for the best.

•

LABOR

Maurice Travis won the Mine, Mill election, but by too narrow a margin for the left-wingers' comfort. Charles McLean, his opponent (from Butte), can remake Mine, Mill if he doesn't give up the fight on the Communist issue.

•

AT HOME

Erie Mining Co. has arranged to sell $207-million in first mortgage bonds to finance initial development of a taconite project near Aurora, Minn. Annual capacity of the plant will be 7.5-million tons of pellets to start. Anaconda's engineering department will design the plant. A 73-mile railroad and townsite are also planned.

Hanna has completed grading at its Riddle, Oregon, nickel project. It may be in production late in 1954.

Senator Malone's blast on lagging titanium metal output may force more government aid on titanium producers. Output is now about 2,000 tons yearly. Malone wants it boosted to 35,000 tons yearly.

•

ABROAD

Chilean copper ought to be flowing to market (at the market price) before long, if it isn't already. As November ended, it looked also as if exchange and tax relief were in sight for hardpressed producers.

The bulls were baffled in the tin market by the U.S.' statement at the Geneva tin conference that the U.S. will own by March a surplus of 40,000 tons of tin over stockpile needs. U.S. isn't likely to use it as a club, as Symington did, but the news did dampen a modest price upturn.

MARKETS—Trends and Prices

Chilean Copper Deal Nears General Approval—U.S. Consumption of Metals at Slower Pace

INDUSTRIES CONSUMING nonferrous metals operated at a slower pace during November, which was more or less expected. Inventory adjustments and uncertainty over the trend of business under more normal conditions accounted for cautious buying. According to the National Association of Purchasing Agents, "industry is making some important adjustments to contend with the slower pace of business."

The Federal Reserve Board's index of industrial production declined from 231% of the 1935-39 average in October to 228% (preliminary) in November. A year ago it was 234%.

Prices for the major metals held up remarkably well, particularly copper. Speculators on the London Metal Exchange really had a tough time. It will be recalled that they were extremely bearish around midyear. Covering by shorts in November virtually raised the price of prompt copper in that market to the 30c. basis. Just what has happened in London since free trading began on Aug. 5 stands out boldly in the following bid and ask quotations:

	1st Session (Long Tons)	
	Aug. 5, 1953	Nov. 30, 1953
Prompt	£215@£217½	£232 @£233
Three months	£200@£202½	£223½@£224

A modest rise in the *E&MJ* index of nonferrous metal prices in the domestic market, from 180.05 in October to 180.45 in November, reflected higher copper and tin averages.

Chilean Settlement Nears

Outstanding in developments was the news from Chile that important committees — foreign, finance and mining — approved terms of sale of Chile's surplus to the U.S., and a revision of exchange and tax schedules. This action, announced Nov. 25, is expected to result in a new agreement by the middle of December.

When ratified by all concerned, the agreement calls for the sale of 120,000 tons or more of Chilean copper at 30c. per pound to the U.S. for its strategic stockpile. It will also restore a free market in Chilean copper, excluding sales to Communist countries.

Workers returned to their jobs at Chuquicamata and Potrerillos, Anaconda's Chilean properties, on Nov. 30. These important mines, shut down for seven weeks, accounted for production of 19,500 tons a month. Wage and other demands of workers have yet to be settled.

Another development pointing to the early settlement of the Chilean problem was an announcement by the Nord Deutsch Affinerie, of Hamburg, that it has renewed its contract for treating Paipote blister and the production of ore and concentrates from some of the small independent mines.

The buying movement in copper in the U.S. met with a setback during November. The sales volume reported by the industry dropped to a little under 90,000 tons on deliveries scheduled for November. Actual use of copper fell somewhat, but hardly to the extent that sales have dwindled. Operators thought this pointed to a reduction in inventories. In October, producers shipped 110,519 tons of copper to domestic fabricating plants. During the same month, the fabricators delivered the equivalent of 116,259 tons of copper to their customers.

Large mine operators in the U.S. held to the 30c. basis for copper and fabricators, with perhaps a few exceptions, sold their products on this same basis. Custom smelters held to 29½c. on the bulk of their sales of copper. First quarter copper sold in the foreign division as low as 27¾c., f.a.s. N.Y. equivalent.

With export trade in scrap again a factor in the market, competition for the available supply has naturally increased and raised prices on the top grades. Output of copper recovered from scrap by custom smelters has been smaller in recent months than generally anticipated.

Production of refined copper by the entire group reporting to Copper Institute, domestic and foreign, totaled 218,770 tons in October. This compares with the peak of 234,245 tons produced in June. The drop was caused by work stoppages in Chile and at Noranda (Canada).

Lead Demand Holds

Demand for lead has improved abroad and continued at a good level in the U.S. As a result, the price of 13½c. per pound, N.Y., was easily maintained. The improved outlook removed much of the pressure from the domestic market. Though agitation for increased tariff protection for both lead and zinc continued, quick action on the part of the Government to alter the rates seems unlikely.

Zinc, the problem child of the metals industry, has not yet shown any signs of recovering from its severe slump. Curtailment in production of the metal is taking place and imports have fallen off sharply. Unfortunately, consumption of zinc also has slumped and stocks on hand are still too large. Prime Western zinc continued at 10c., East St. Louis.

Stocks of slab zinc at the end of October stood at 158,417 tons, which compares with 141,561 tons a month previous and 95,342 tons a year ago.

The common grade of zinc on the London Metal Exchange has moved up to a shade above 9¼c. per pound.

Antimony was lowered by the leading domestic producer to 28½c. per pound, bulk, f.o.b. Laredo, a reduction in the price of 6c. The decline was expected because foreign metal has been available for some time at sharp concessions from the domestic selling basis. Supplies have been ample.

Average Prices for November (E&MJ Quotations)

Copper:	
Electrolytic, domestic, refinery	29.651
Electrolytic, export, refinery	28.848
Lead:	
Common, New York	13.500
Common, St. Louis	13.300
Silver and Sterling Exchange:	
Silver, New York, per oz.	85.250
Silver, London, pence per oz.	74.000
Sterling Exchange, "Checks"	281.101
Zinc:	
Prime Western East St. Louis	10.000
Prime Western, delivered (g)	10.500
Tin:	
New York Straits	83.318
New York, 99% min. (e)	82.318
Gold, per oz. U.S. price	$35.000
Quicksilver, per flask	$184.091
Antimony (E&MJ) (d)	37.152
Antimony, bulk, Laredo	33.682
Antimony, in cases, Laredo	34.182
Platinum, refined, per oz.	$91.591
Cadmium (a)	200.000
Cadmium (b)	207.500
Cadmium (c)	215.000
Aluminum, 99% plus, ingot	21.500
Magnesium, ingot	27.000
Nickel (f)	60.000

Domestic quotations, unless otherwise stated, are in cents per pound. Sterling exchange checks, in cents. Quicksilver, per flask of 75 lbs.

(a) Cadmium average based on the producers' quotations.

(b) Cadmium average based on the average of the producers' and platers' quotation.

(c) Cadmium average based on platers' quotation.

(d) Domestic, 5 tons or more but less than carload lot, packed in cases, f.o.b. New York.

(e) Tin content.

(f) F.o.b. Port Colborne, U.S. duty included.

(g) Delivered where freight exceeds 0.5c.

Markets Continued on Page 114

Platinum was unsettled on reports that Russia has been selling the precious metal in the European market on the basis of roughly $90 an oz.

Wolfram of foreign origin has dropped sharply, being quotable at $28 per short ton unit of WO_3 for nearby shipment. Scheelite of a grade suitable for direct smelting has been holding at between $32 and $35 per unit. These quotations are based on c. i. f. transactions.

There has been no improvement in the demand for manganese ore. Large consumers are carrying large inventories. The operating rate in steel is falling.

"Free" Gold Market

Russia sold about 1,500,000 oz. of gold in the European market during November. Russia has been selling to obtain sterling credit for the purchase of consumer goods. The free market has dropped to the official level for the first time since World War II. Pick's World Currency Report quotes free gold as follows, per fine oz.:

	COINS		BARS (12.5 kg.)	
	Oct. 30	Nov. 30	Oct. 30	Nov. 30
NEW YORK, transit	.....	.....	$35.95	$35.00
MANILA	$42.00	$41.00	38.60	37.50
HONG KONG	42.50	41.00	38.00	35.25
BOMBAY	46.75	46.50	45.50	44.50
TANGIER	41.70	40.50	35.95	34.95
BEYROUTH	41.50	40.45	36.10	35.10
PARIS	48.70	44.50	36.60	35.85
BUENOS AIRES	43.00	42.50	39.70	35.80

Note: All prices are computed at the free or black market value of the U. S. dollar in the local markets.

Major Metals

U. S. DAILY AND AVERAGE PRICES

Nov. 1953	Electrolytic Copper (a) Domestic	(b) Export	Straits Tin New York	Lead New York	Lead St. Louis	Zinc Delivered (f)	Zinc East St. Louis
2	29.675	28.875	81.500	13.500	13.300	10.500	10.000
3	Holiday	28.900	Holiday	Holiday	Holiday	Holiday	Holiday
4	29.700	28.850	81.750	13.500	13.300	10.500	10.000
5	29.675	28.975	82.500	13.500	13.300	10.500	10.000
6	29.700	28.800	82.000	13.500	13.300	10.500	10.000
7	No Market	28.875	82.000	13.500	13.300	10.500	10.000
9	29.700	28.875	82.000	13.500	13.300	10.500	10.000
10	29.675	29.025	81.750	13.500	13.300	10.500	10.000
11	Holiday	29.025	Holiday	Holiday	Holiday	Holiday	Holiday
12	29.600	28.650	82.250	13.500	13.300	10.500	10.000
13	29.700	28.375	82.000	13.500	13.300	10.500	10.000
14	No Market	29.025	82.000	13.500	13.300	10.500	10.000
16	29.575	29.050	82.500	13.500	13.300	10.500	10.000
17	29.575	28.450	83.000	13.500	13.300	10.500	10.000
18	29.625	29.050	83.750	13.500	13.300	10.500	10.000
19	29.525	28.750	83.250	13.500	13.300	10.500	10.000
20	29.600	28.475	83.750	13.500	13.300	10.500	10.000
21	No Market	28.925	83.750	13.500	13.300	10.500	10.000
23	29.650	28.825	85.250	13.500	13.300	10.500	10.000
24	29.700	29.025	86.250	13.500	13.300	10.500	10.000
25	29.675	28.925	86.250	13.500	13.300	10.500	10.000
26	Holiday	29.000	Holiday	Holiday	Holiday	Holiday	Holiday
27	29.675	28.775	85.750	13.500	13.300	10.500	10.000
28	No Market	28.775	85.750	13.500	13.300	10.500	10.000
30	29.700	28.925	84.000	13.500	13.300	10.500	10.000
	AVERAGES FOR MONTH						
Nov.	29.651	28.848	83.318	13.500	13.300	10.500	10.000
	AVERAGES FOR WEEK						
Nov.							
4	29.688	28.808	81.900	13.500	13.300	10.500	10.000
11	29.688	28.929	82.050	13.500	13.300	10.500	10.000
18	29.615	28.767	82.583	13.500	13.300	10.500	10.000
25	29.630	28.821	84.750	13.500	13.300	10.500	10.000
	CALENDAR WEEK AVERAGES						
Nov.							
7	29.688	28.879	81.950	13.500	13.300	10.500	10.000
14	29.669	28.829	82.000	13.500	13.300	10.500	10.000
21	29.580	28.783	83.333	13.500	13.300	10.500	10.000
28	29.675	28.888	85.850	13.500	13.300	10.500	10.000

Silver, Gold and Sterling

DAILY AND AVERAGE PRICES

Nov. 1953	Sterling Exchange "Checks"	Silver (c) New York	Silver (c) London	Gold London	Gold (d) United States
2	281.1250	85.250	74.000d.	248s.	$35.00
3	Holiday	Holiday	74.000d.	248s.	Holiday
4	281.1875	85.250	74.000d.	248s.	35.00
5	281.0000	85.250	74.000d.	248s.	35.00
6	281.0625	85.250	74.000d.	248s.	35.00
7	(e)	(e)	(e)	(e)	35.00
9	281.1250	85.250	74.000d.	248s.	35.00
10	281.1250	85.250	74.000d.	248s.	35.00
11	Holiday	Holiday	74.000d.	248s.	Holiday
12	281.0000	85.250	74.000d.	248s.	35.00
13	281.0000	85.250	74.000d.	248s.	35.00
14	(e)	(e)	(e)	(e)	35.00
16	281.1875	85.250	74.000d.	248s.	35.00
17	281.1250	85.250	74.000d.	248s.	35.00
18	281.1250	85.250	74.000d.	248s.	35.00
19	281.0625	85.250	74.000d.	248s.	35.00
20	281.0625	85.250	74.000d.	248s.	35.00
21	(e)	(e)	(e)	(e)	35.00
23	281.0625	85.250	74.000d.	248s.	35.00
24	281.1875	85.250	74.000d.	248s.	35.00
25	281.1250	85.250	74.000d.	248s.	35.00
26	Holiday	Holiday	74.000d.	248s.	Holiday
27	281.1875	85.250	74.000d.	248s.	35.00
28	(e)	(e)	(e)	(e)	35.00
30	281.0625	85.250	74.000d.	248s.	35.00
	AVERAGES FOR MONTH				
Nov.	281.101	85.250	74.000d.	—	35.00
	AVERAGES FOR WEEK				
Nov.					
4	281.063	85.250	—	—	—
11	281.078	85.250	—	—	—
18	281.088	85.250	—	—	—
25	281.100	85.250	—	—	—

Calendar Week Averages, New York Silver: Nov. 7th, 85.250; 14th, 85.250; 21st, 85.250; 28th, 85.250.

(e) No Market (Saturday).

THE above quotations for major non-ferrous metals are our appraisal of the important United States markets, based on sales reported by producers and agencies. They are reduced to the basis of cash, New York or St. Louis. All prices, except gold and silver, are in cents per pound.

(a) Net prices at refineries on Atlantic seaboard. To arrive at the delivered New England basis add 0.300¢ per pound, the average differential for delivery charges.

(b) Our export quotation for copper reflects prices obtaining in the open market and is based on sales in the foreign market reduced to the f.o.b. refinery equivalent, Atlantic seaboard. On f.a.s. transactions we deduct 0.075¢ for lighterage, etc., to arrive at the f.o.b. refinery quotation.

Copper, lead and zinc quotations are based on sales for both prompt and future deliveries; tin quotations are for prompt delivery only.

Quotations for copper are for the ordinary forms of wirebars and ingotbars; cathodes are sold at a discount of 0.125¢ to 0.15¢ per pound. Quotations for zinc are based on Prime Western brands. Zinc in New York commands a premium over the St. Louis basis equal to the freight differential. Contract prices for High Grade zinc delivered, in the East, Middle West, and West, effective Jan. 1, 1951, commanded a premium of 1.35¢ per pound over the current market for Prime Western; Special High Grade 1.50¢.

(f) Prime Western delivered where freight from E. St. Louis exceeds one-half cent.

Quotations for lead are based on domestic common lead. Corroding lead commands a premium of 10 points.

(c) The Daily New York silver quotation reported by Handy & Harman is for silver contained in ores and other unrefined silver-bearing materials, in cents and fractions of a cent per troy ounce. It is determined by Handy & Harman on the basis of actual sales of bar silver .999 fine in amounts of 50,000 ounces or more for nearby delivery at New York, as reported daily by regular suppliers, and is usually one quarter-cent below the price paid for such bar silver, this deduction being the allowance to such suppliers for carrying, delivering and marketing. In addition to foreign silver, the quotations also apply to domestic silver if such silver enters into the New York market.

The Treasury's purchase price of newly mined domestic silver is 90.5¢ per troy ounce 1000 fine, effective July 1, 1946. London silver is pence per troy ounce, basis .999 fine.

(d) U.S. Treasury's gold price. Actual payment by the United States Treasury for gold is at .99.75 per cent of the price quoted by the Treasury, which is equal to $34.9125.

Behind the By-Lines...

G. P. Lutjen

Our cover this month conveys the Season's Greetings to you from every member of the *E&MJ* staff. We feel it makes an appropriate Christmas card because (a) it depicts the customary pine trees and snow; (b) it's a mining scene, and (c) this mine, the Erzburg in Austria, was getting rock in the box at the time the Wise Men were making their way to Bethlehem: In fact, archaeological evidence indicates that mining was going on 1,000 years before that!

Unhappily, Erzburg iron has been used in weapons from the time of Caesar's legions to the recent adventures of Hitler's Wehrmacht.

How Erzburg came to have so much iron is a legend still told in Austria. It seems a merman (no kin of Broadway's Ethel) was captured on the shores of an Alpine lake near Erzburg. In return for his freedom, the merman offered his captors a choice of:

All the gold they could mine in a year;
All the silver they could mine in 10 years; or
Enough iron to last forever.

The local citizenry, apparently a posterity-minded group, chose the iron. So far, about 255-million tons of it have been mined, and geologists estimate that about 350-million tons remain, which means that ye merman was making more than just a campaign promise. On p. 125 of this issue, you can find out what they are doing about that 350-million tons still in the ground.

Coming by the by-line on p. 72 was as easy as sipping cider on the back porch, or even easier.

We just walked into the office of National Lead Co.'s assistant general manager at Fredericktown, Jim Phebus (left) and asked, in effect, "What's cooking?" The answer required (1) a pleasant two-day tour of the property; (2) chatting with a half dozen busy but affable engineers; (3) five pages in this issue to tell about the plans for the new refinery that will recover cobalt and nickel from the Fredericktown ore by chemical methods and what it all means to the existing mine and mill set-up.

Perhaps it is indicative of how busy they are at Fredericktown, but when we walked into the temporary office of the new refinery, we counted so many telephones, that for one fleeting moment, we thought we had hit the inner sanctum of the local bookmaker. Turned out that the only wagers in those parts were on the new plant. No takers!

You may be responsible for the article that starts on p. 83, "*E&MJ* Visits the General Superintendent of the U. S. Largest Titanium Mine." The reason that we fix the beady eye of blame on you is that it has become increasingly apparent that *E&MJ* readers have an active interest in all the occupations that exist in the mining industry. To satisfy this curiosity, we plan to take up, one by one, the different positions that mining men hold, from the chairborne executive to the shift boss on the 550 level. As a by-product, we intend to use this format to bring you information about the operations where these protagonists, whoever they may be, hold forth.

For our maiden effort in this direction, the boss dispatched 22.2% of the staff with notebook and camera to Tahawus, N. Y. Net Result: By turning to p. 83 you, too, can see what it's like being a general superintendent at an open pit mine.

The Damon Runyon of the mining camps, Atha Albert Richie, is with us again, we are happy to report. On p. 89 you'll find his account of "The Great Pack-Burro Race at Death Valley," written in his inimitable style, both amusing and expressive. Not since reading Runyon's tales of such citizens as Rusty Charlie, Nicely-Nicely Johnson, Harry the Horse, and Brandy-Bottle-Bates, have we come across such vivid noms de vie as Richie's Seldom-Seen-Slim and Six-Line Billy Higdon.

Denver Equipment Co. threw us a curve last month. We always look forward to receiving *Deco Trefoil,* the informative house organ the company publishes, but in the recent issue, in a department they have maliciously entitled, "Test Your Wits," they dealt a severe blow to our professional pride. Just for kicks, here's the wit tester for you to try. Watch out!

As you read the sentence in capitals below, count the number of "F's" in the sentence. Jot down the figure before you go back for a recount.

"FEDERAL FUSES ARE THE RESULT OF YEARS OF SCIENTIFIC STUDY COMBINED WITH THE EXPERIENCE OF YEARS."

The answer is in the last paragraph below.

The stamp reproduced at the left commemorates the nationalization of mines in Bolivia. Its probably not much consolation, but it isn't every mining company that gets even such indirect recognition of the role it has played in helping a nation keep its rendezvous with destiny. As we say, it isn't much consolation if you are one of the entrepreneurs formerly in business in Bolivia, but at least you know you haven't been forgotten by our Good Neighbor.

P.S. The answer to the how-many-"F's" fiasco above is six. A first guess of three is par.

ENGINEERING AND MINING JOURNAL
DECEMBER, 1953

Let's Liquidate The Individual

WE HAVE just been considering the report on U.S.-Latin American relations turned in recently to President Eisenhower by Dr. Milton S. Eisenhower. Aside from certain practical problems the report raises, it is interesting for the additional evidence it embodies of the growing trend toward vastly different treatment of men as individuals and men as members of politically important groups. As an individual, you live more or less in line with your income, or else.

But you, collectively, can flout these rules. For example, you can force your government to pay you a high price for producing huge quantities of food no one else will buy at that price. Or you can commit the wildest economic errors, and the U.S. government will protect you from the consequences.

We don't mean to be bitter about it. We're only pointing out to you that the U.S. is apparently adding another to its list of obligations to be responsible for at the expense of the U.S. individual.

The Eisenhower report starts on the premise that "the U.S. must be constantly alert in maintaining and improving the political, economic, military, and cultural relations with the other American Republics."

The report stresses, quite properly, that trade with Latin America and U.S. investment in Latin America are tremendously important to the U.S. This trade, each way, came to about $3.5-billion in 1952.

But the report also says, "If tariff, or other changes, should cause a drop in our purchases from Latin America, every part of the United States would feel the effects."

What can the U.S. purchase from Latin America? Raw materials, of course, iron ore, tin, oil, copper, and so on. If the Latin American countries can't sell the U.S. these raw materials at a high price, obviously they can't buy as much goods manufactured in the U.S. as otherwise.

Therefore, the U.S. should, the report says, "adopt a long-range basic material policy which will permit purchase for an enlarged national stockpile of certain imperishable materials when prices of such materials are declining."

The United States is already doing just that, policy or no, with Bolivian tin and Chilean copper. In each case, it had to be done to extricate the governments concerned from an impossible position into which they had been directed by unrealistic policies fostered, it must be admitted, by our government as well as their own.

We believe the U.S. government shares some of the blame for the difficulties faced by the Chilean and the Bolivian governments, and should rightfully share the burden of alleviating them. But is the U.S. government now to be responsible for the mistakes of all Latin America?

Let's narrow the focus down to what the effect would be on the U.S. stockpile if Dr. Eisenhower's suggestion is adopted. Every metal and mineral-producing country in Latin America could then produce full force, secure in the knowledge that the U.S. stockpile would take whatever it couldn't sell elsewhere at a high level.

If Latin American miners can rest on this cushion of the U.S. stockpile, why can't U.S. miners, too? They can, of course, or rather they would, and before long, the U.S. stockpile would loom as ridiculously large as the mountain of butter the U.S. now owns.

Someday, some industrial-minded Congress would liquidate that vast stockpile, and then we'd all be sorry we ever heard of it. We might, of course, have to use some of it to fight a war, but a strategic stockpile is a different consideration.

Also, may we point out that this proposal to use the U.S. stockpile to soak up Latin America's excess mineral output in nothing but an entering wedge for the Paley Report's international buffer stockpile.

It is probably useless to suggest that foreign countries, like individuals, won't need this artificial aid if they can be induced to live within their means and concentrate on ways to *earn* money, and not on ways to spend it. Forgive us for mentioning such outmoded economic doctrine!

Let us take care of everyone! Let us subsidize the manufacturer who makes too many cars, the miners who produce too much metal, the governments who spend more than their income, the farmers who produce too much. Everybody!

And the individual who in the end pays for it all? Simple. If he can't, or won't, become part of one of these pressure groups, liquidate him.

National Lead's new plant gets ready for production of . . .

Cobalt at Fredericktown

GEORGE P. LUTJEN
Associate Editor

WHEN NATIONAL LEAD CO.'S new refinery in Fredericktown, Mo., starts up early next year it will be the second plant in the U. S. to use the Chemico process, but the first to adapt it to an existing mining and milling operation. Along with increased total metal recovery, the process brings need for flexibility in the mill flowsheet to permit the most profitable wedding of mill and refinery. That's why, as the contractor's (Chemical Construction Co.) crews rush the new plant to completion, National Lead is gearing its mine, and more especially its mill, for Operation Dovetail.

On the basis of pilot plant tests National Lead expects the new installation to add about 1,400,000 lb. of cobalt and somewhat less nickel each year to Fredericktown's present annual production of approximately 10,000 tons of lead and 2,500 tons of copper. Best hints on what the flowsheet will be like come, perhaps, from comparison with two other plants designed for the chemico process. Separation of metals at Fredericktown is more complicated than at Howe Sound's Garfield refinery. Its practice more nearly will approach that of Sherritt Gordon in Manitoba: ammonia leach and oxidation under pressure, removal of excess ammonia by boiling and precipitation of copper, pressure hydrolysis, successive hydrogen reduction of nickel and cobalt. Like the Canadian plant, Fredericktown will have an ammonium sulphate byproduct, but the problem of marketing this in southeast Missouri is simple, and in fact has already been taken care of.

Biggest difference between the operations is that Fredericktown will carry on oxidation at much higher pressure: about 1,000 psi as compared with 125 psi at Sherritt Gordon.

National Lead's metallurgists, keeping an eye on the Garfield plant, are not discouraged by the Chemico process' somewhat less than unqualified success there. Larry Eck and Ed Peters, who will run the new refinery, point out that Fredericktown concentrates are much less abrasive than those at Howe Sound's plant. Abrasion has been a major source of difficulty at Garfield. Then, too, Eck and Peters feel fortunate in being able to capitalize on the pioneer plant's experience in a number of small design changes. For example, they will use mechanical seals in the place of packing glands and there will be changes in items like pump linings and valves.

To these advantages the National Lead people have added the insurance of sound engineering and design in sub-contracting phases of construction like boiler installation and plant instrumentation, to top-notch companies.

To staff this chemical plant, Eck and Peters are already at work training a cadré of young chemical and metallurgical engineers which will include specialists in high pressure work, and in instrumentation to keep the plant's extensive control system at peak effectiveness. When full scale operation is reached, they expect to have better than two

LARRY ECK

"Nearly every kind of chemical engineering process equipment is used in this plant."

ED PETERS

"We're training a nucleus of good engineers who'll know every valve in the plant."

These men will run the new plant

dozen engineers on the job there.

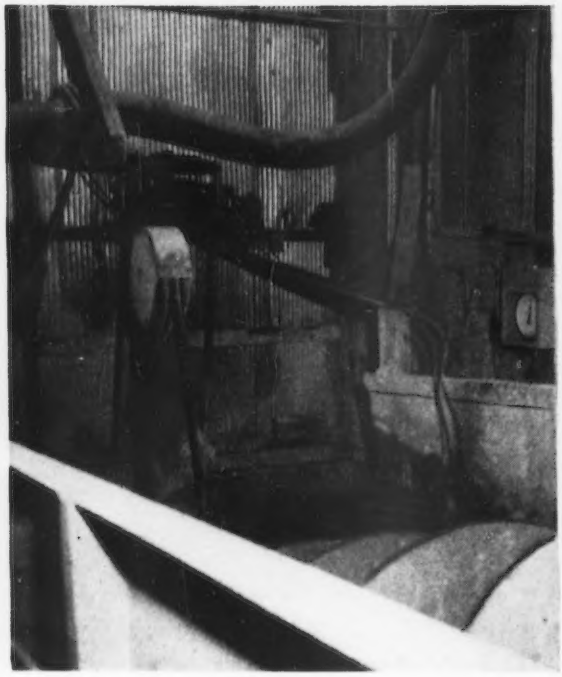
Accurately predicting the metallurgical balance of the plant at this early date is strictly for soothsayers. It will depend on exactly what results the Chemico process will obtain with variations in feed that are possible from the mill. The final combination of mill and refinery practices will be determined only after enough experience has been accumulated to provide a close-up view of the economics involved. Meanwhile, the mill is being readied for as wide a range of eventualities in the refinery as possible, like the old trouper waiting to adjust herself to the temperament of the new star.

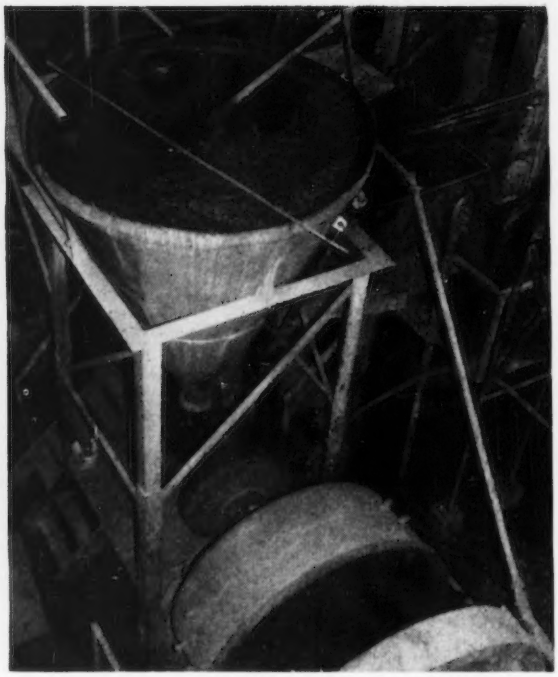
Feed for the mill is an ore containing from 2.5 to 2.75% lead; from 0.5 to 0.75% copper; about .25% each nickel and cobalt; and from 5 to 6% iron. The mill treats an average of 1,350 tons a day varying between a maximum of 1,500 tons per day when mining softer ore, to about 1,200 tons a day when the rock is hard. Ore is crushed to about 3 to 4 in. in a Telsmith 13D crusher. A 4-ft. Symons shorthead crusher further reduces the ore to about ½ in. This fine ore is stored in two 300-ton wooden bins and one 500-ton steel bin. The steel bin feeds ore to a 10 ft. x 48-in. Hardinge ball mill in closed circuit with a 72-in. Wemco spiral classifier. Ore from the wooden bins goes to an 8 x 6 Marcy mill in closed circuit with a 60-in. Wemco spiral. Both mills grind about 2% on 48 mesh. The ground products are mixed and fed to the flotation circuit shown in the accompanying flowsheet. With lime being added to depress the iron, a bulk float is made of the sulphides. This bulk concentrate is cleaned and cyanide is added to depress all sulphides but the lead, which is then floated to produce a 78 to 80% lead concentrate containing about 1% copper and less than ½% nickel and cobalt. This concentrate is shipped to the Herculaneum smelter of the St. Joseph Lead Co., 60 mi. north.

The remainder of the sulphides, or "lead separation tails," are thickened and ground to 60% minus 200 in the regrind circuit. The product goes to copper flotation. A concentrate containing 27 to 30% copper flotation, "iron tails," conto El Paso for smelting. Tails from copper flotation, "iron tails," contain about 2% nickel and cobalt. These have been heretofore pumped to storage ponds. As of the end of January they will be fed to the new chemical refinery

Besides current "iron tails" production, the refinery will get about a third of its feed from reclaimed "iron tails" in the ponds where the company has been storing them for about 8 years. These will be put through a regrind circuit now being installed, like the one already in the mill; a 6 x 4½-ft. ball mill in closed circuit with a shop-fabricated classifier to produce a 60% minus 200 mesh flotation feed. By obtaining cobalt and nickel as a float product it is possible to produce about a 12% concentrate. For a start this will be blended with current "iron tails" to provide about a 7% feed for the refinery. Blending like this will be one way of providing flexibility to fit in with best refinery practice and best overall economics.

Why not upgrade current Co-Ni production as well as the reclaimed material? This is a possibility but according to Art Lankanau, mill superintendent, oxidized cobalt-nickel ores will float more easily. If upgrading of the current production becomes feasible, an interesting possibility lies in pulling the roughers much harder to pick up the maximum amount of sulphides for maximum cobalt and nickel re-





In the mill there may be some changes made—depends on

DENSITY CONTROLS in grinding circuits have sensing units near overflows of classifiers.

REGRIND UNIT with cone thickener, ball mill and classifier, will be duplicated for reclaiming cobalt.

covery. (Keep in mind the relative values of a pound of cobalt and a pound of lead.) If even higher grades of feed are required for optimum efficiency in the refinery, high grade cobalt from other sources may be used for sweetening the feed.

One of the factors to be determined in the refinery, is how much copper it will handle satisfactorily. If all the recoverable copper could be extracted in the refinery, the copper circuit in the mill could be shut down and reground lead-separation tails sent directly from mill to refinery, or to cobalt-nickel flotation cells in what were formerly copper flotation cells.

Having noted somewhere that the government had some old roasted cobalt ores around, we asked Assistant General Superintendent Jim Phebus if these would be treated by National Lead. His answer was that they would eventually be willing and happy to do business on a custom basis. This applied to government stocks as well as to new ore found by other companies.

While ore dressing in the mill is fairly straightforward, leaving Art Lankanau plenty of room for maneuvering in furnishing a suitable feed for the refinery, two problems complicate his operation:

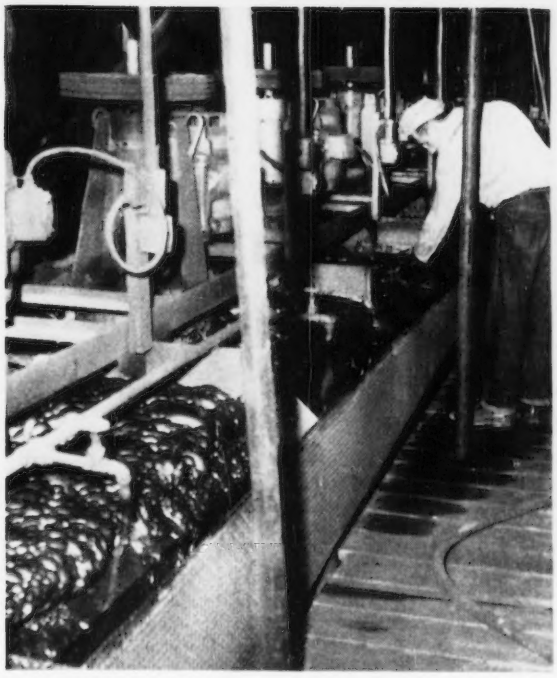
One is the excessive amount of mud in ore. This mud gets into the crushers, causing a bottleneck capable of making substantial dents in the production curve. Consensus of opinion leans toward a redesigned crushing plant with suitable grizzly ahead of the crushing equipment to minimize the trouble when rains aggravate the mud situation in the mine.

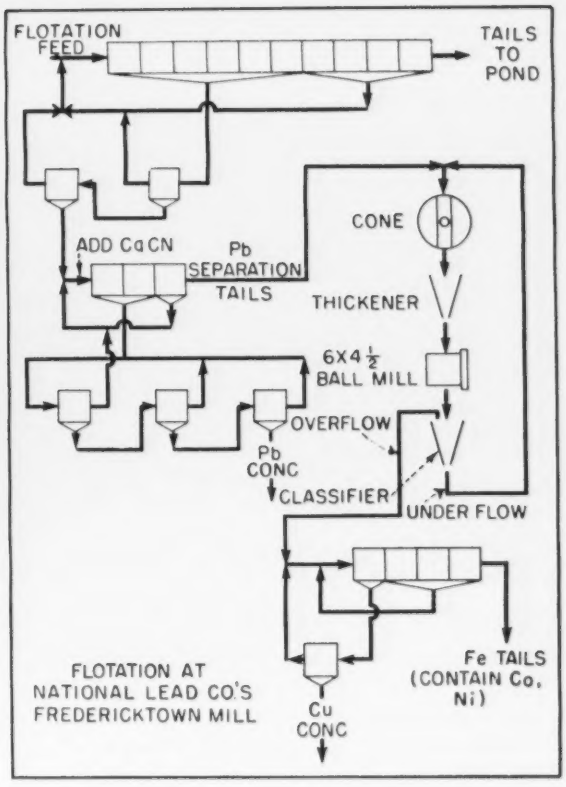
The second problem is maintaining a consistent feed. Not only does total sulphide content vary through the mine but the cobalt-nickel content varies. The latter variation is related to the copper content, but cobalt and nickel are not associated

These men run mill and mine

ART LANKANAU, mill superintendent, finds mud a big problem.

RAY SCHULTZ, mine superintendent, puts accent on maintenance.





what the refinery can do

COPPER FLOTATION section may be converted to Co-Ni flotation if refinery can handle copper.

with copper in the geologic sense. Operators like to see the copper content of the ore between 0.6% and 0.8% for good Co-Ni values and not too much iron which also varies directly with the copper content.

Total sulphide content has upper limits too. If it gets too high, the rougher will pull it, but the circuits won't handle it from there on. Aggravating this condition is the fact that softer rock, which can be crushed faster, is the better grade ore. These vagaries which may fluctuate fairly rapidly keep mill operators on their toes.

Underground, Mine Superintendent Ray Schultz keeps variations in grade of mill feed to a minimum by maintaining 25 headings for supplying ore.

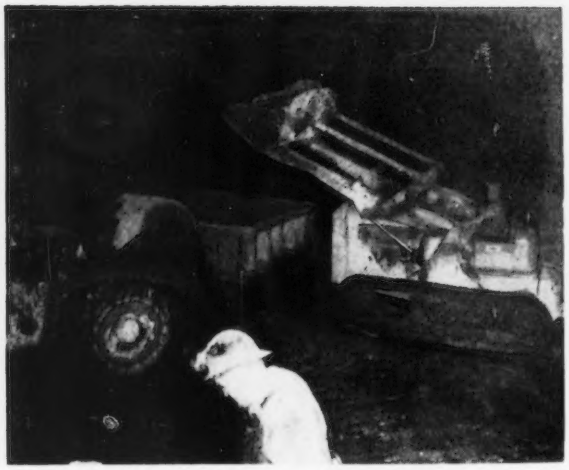
Mining operations follow the ore wherever it goes in any dimension. The host rock, Bonneterre dolomite, is underlain by the differentially compacted La Motte sand-

In drilling, its jumbo versus air leg

JUMBO mounted on tracks brings speed and efficiency to drilling in headings.

AIR LEG is used in slashing for breaking to open face, when only one drill on jumbo may be effective.

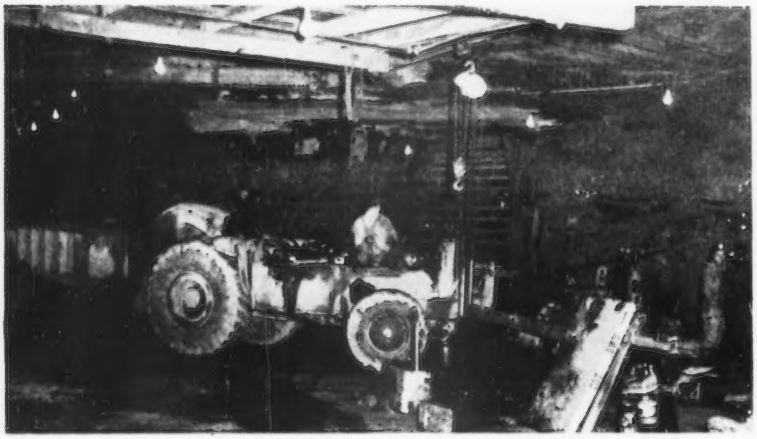
POWER SHOVEL loads muck broken during several shifts. Tractor-trailer unit hauls 4 tons.



FRONT END LOADER can get around the mine most easily. Handles smaller loading jobs.

These units do the loading and hauling

DRAG can load efficiently where shovel hasn't room to maneuver. Dumptor offers high speed haulage.



UNDERGROUND SHOP is equipped to handle most of the mine's maintenance problems.

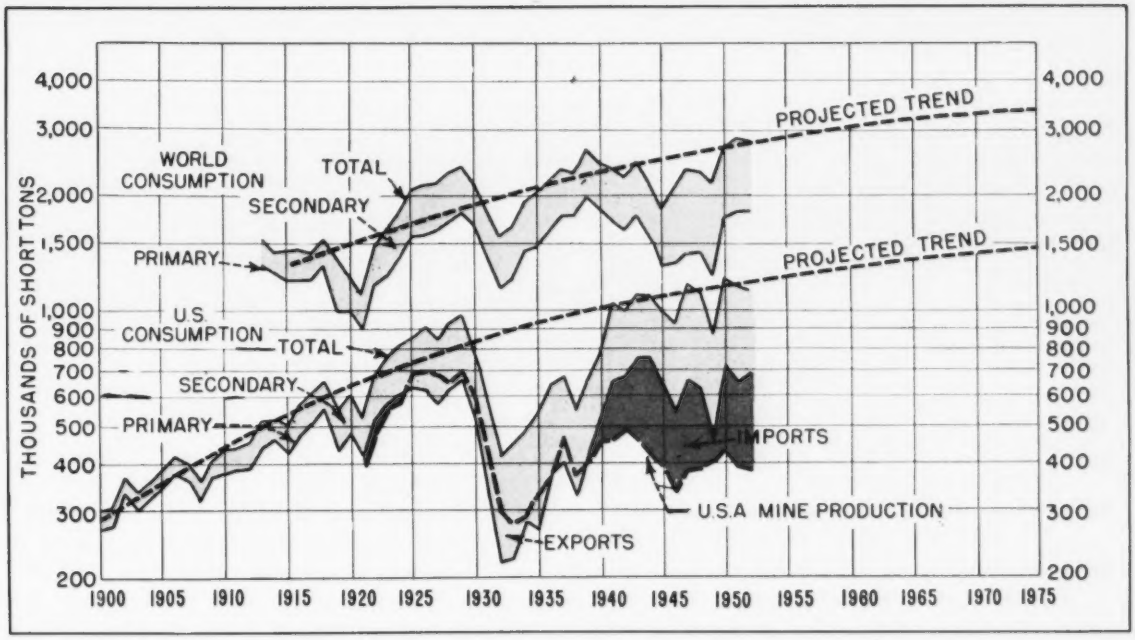
stone which in turn lies in irregular and broken basins formed by the severely eroded pre-Cambrian surface. The Pre-Cambrian penetrates the Bonneterre along the sides of the basins. Ore minerals, mainly galena and pyrite with some chalcopyrite and siegenite, occur in economic concentrations in the lower 25 ft. of the Bonneterre dolomite at an average depth of 300 to 400 ft. below surface. Deposits are highly irregular in shape. And because they also extend over broad areas, diesel haulage is extremely practical and mechanized trackless mining virtually a necessity.

Drilling is done by tractor mounted jumbo and airlegs. Because much mining is done by slashing where only one drill on the jumbo is effective, the airlegs have gained steadily in use and at least four different manufactures have been tried.

Loading and hauling units are illustrated in accompanying photographs. Maintenance of this equipment is handled in a huge, well-equipped, underground shop.

If and when the present crushing plant is replaced, an underground crusher has been suggested. Improved handling of mud plus faster hoisting, made possible by a recently installed replacement hoist, could increase mine production appreciably. But whether an increase is warranted depends on what the new refinery can do.

Mine and mill are ready to dance to the tune that the new refinery calls. What happens at Fredericktown now will be decided in the autoclaves of the new plant. And beyond Fredericktown, mining men everywhere will be watching.



THIS IS THE TREND of increased consumption of lead in the U.S. and the world, providing the price incentive brings out needed production. Note the increasing dependence of the U.S. on imports, a trend that is likely to continue.

What Price Lead, 1953—1975?

On the basis of the long-term trend of production costs of lead producers, both domestic and foreign, it is suggested that over the next 22 years world requirements will not be met at an average price lower than 15¢ per lb.

WILLIAM P. SHEA
Statistician
C. Tennant, Sons & Co.
New York, N.Y.

LEAD'S UNIQUE CHARACTERISTICS make it the most effective raw material now known for satisfying a great many present industrial needs and, no doubt, a great many others yet to be developed in the future.

Because lead's share in the world's ever-increasing use of metals seems likely to remain as firmly established as ever, it seems prudent to examine the possible sources of greater future supplies of lead, with particular reference to their economic position.

Accordingly, there is presented here a survey of the world's present and future use of lead, its probable sources of supply, and its present and future costs of production.

Lead's Changing Picture

The long-term stability of lead's place in industry is apparent from the accompanying chart, which shows the world's use of lead over the past 53 years, the longest period for which reliable statistics are available.

Note that such stability applies only to the total industrial use of lead. Among individual uses there has been wide variety in rates of growth.

For example, in the U. S. since 1913, use of lead in storage batteries has increased by 378%, in solder by 225%, in calking by 213%. Use in white lead, however, is only 30% of what it was 40 years ago. Tetraethyl gasoline, unheard of 40 years ago, is now the second largest consumer.

Total use of lead continues at about the same trend of growth in evidence in 1913 (Table I). In the same way, total use of lead for the world as a whole (including USSR) seems to continue on a well established long-term trend. (Table II).

These trends have been projected to the year 1975, not as estimates of required amounts for any given year, but rather to show the levels about which future requirements may well fluctuate.

It may be noted that, despite large increases in market prices, U.S.A. mine production in 1952 was 57% of U.S.A. average production during 1925-1929; the British Commonwealth 1952 total mine production was just about equal to, and Western Europe's 1952 total was 69% of, their respective averages for 1925-1929. These three areas, taken together, for years accounted for the bulk of the world's mine production of lead—they made up 93% of the world's total during the 1913-1914 period and 80% during the 1936-1939 period, but only 54% in 1952.

Table I. Industrial Use of Lead in U.S.A.—1913-1952

(Thousands of Short Tons)

	Av. 1913–14	Av. 1915–18	Av. 1919–21	Av. 1922–24	Av. 1925–29	Av. 1930–35	Av. 1936–39	Av. 1940–45	Av. 1946–50	1951	1952	Estimated 1953	Estimated 1960	Estimated 1975
Storage Batteries	64	91	98	148	195	157	187	259	340	354	306			
White Lead	100	104	121	145	124	70	80	65	38	26	30			
Red Lead & Litharge	35	34	34	37	35	35	53	76	62	79	75			
Cable Covering	60	87	66	121	180	81	72	138	144	137	137			
Building	75	76	62	76	92	36	43	80	63	61	78			
Ammunition	35	49	31	35	38	30	36	85	33	31	29			
Foil	25	23	21	32	37	19	24	21	3	3	2			
Bearing Metal	35	35	31	35	38	15	13	29	37	34	37			
Solder	20	17	14	27	36	19	20	37	65	65	67			
Typemetal	10	6	8	12	16	13	15	21	29	24	28			
Calking	15	7	23	24	31	13	14	30	45	44	47			
Tetraethyl							24	62	82	127	148			
Castings and Other Uses	45	52	48	65	81	49	53	111	120	166	145			
Total	519	581	557	757	903	537	634	1014	1061	1151	1129	1150	1280	1450
Added to Government Stockpile									Av. 72	60	275			
Aver. Price of Lead at New York (¢ per lb.)	4.14	6.92	6.15	7.01	7.47	4.12	5.13	6.16	13.90	17.50	16.47			

Table II. World Use of Lead—1913-1952

(Thousands of Short Tons)

	Av. 1913–14	Av. 1915–18	Av. 1919–21	Av. 1922–24	Av. 1925–29	Av. 1930–35	Av. 1936–39	Av. 1940–45	Av. 1946–50	1951	1952	Estimated 1953	Estimated 1960	Estimated 1975
U. S. A.*	519	581	557	757	903	537	634	1014	1061	1151	1129	1150	1280	1450
Latin America														
Mexico						5	5	7	9	10				
Argentina						9	12	20	34	44				
Brazil						6	9	20	18	21				
Others						1	4	6	5	5				
Total Latin America	11	27	10	25	33	21	30	53	66	80	E 85			
British Commonwealth														
United Kingdom*	215	214	185	211	289	312	406	343	366	382	329			
Canada	29	52	22	25	33	21	25	56	59	61	53			
Australia-New Zealand	10	14	12	14	17	17	28	50	47	59	43			
India	2	4	..	5	6	9	10	20	9	15	11			
South Africa	2	2	2	2	4	5	7	10	9	12	11			
Total British Commonwealth	258	286	221	257	349	364	476	479	490	529	447			
Europe														
West	475	339	228	322	514	472	593	385	308	469	475			
East	..	..	10	13	23	35	44	E 25	E 42	E 55	E 60			
U. S. S. R.	64	43	1	6	40	57	105	82	97	193	226			
Japan	27	41	42	57	77	98	119	61	28	36	E 45			
China							14	E 5	E 10	E 10	E 10			
Others														
Total	1354	1317	1069	1437	1939	1584	2015	2104	2102	2523	2477	2500		
Plus Estimated Secondary Lead outside U. S. A. & U. K.	85	100	90	150	185	175	200	178	293	300	E 300	300		
Total World Use	1439	1417	1159	1587	2124	1759	2215	2282	2395	2823	2777	2800	3000	3350
Added to Govt. Stockpiles:														
U. S. A.									Av.72	60	275			
U. K.								Av.4	2	24	48			
Others														
Total World Requirements	1439	1417	1159	1587	2124	1759	2215	2286	2469	2907	3100	2800	3000	3350
Secondary:														
U. S. A.	67	92	117	186	280	232	251	336	460	498	440			
U. K.	E 37	E 38	E 40	E 73	E 94	E 96	E 81	91	168	200	212			
W. Europe								E 100	E 175	E 200	E 200			
U. S. S. R.	E 85	E 100	E 90	E 150	E 185	E 175	E 200	25	34	44	49			
Japan								48	34	50	45			
Others								E 5	E 5	E 6	E 6			
Total	E 189	E 230	E 247	E 409	E 559	E 503	E 532	E 605	E 876	E 998	E 952			

*U. S. A. & U. K. figures include secondary.

(E) — Estimated

Table III. World Mine Production of Recoverable Lead

(Thousands of Short Tons)

Country	Av. 1913–14	Av. 1915–18	Av. 1919–21	Av. 1922–24	Av. 1925–29	Av. 1930–35	Av. 1936–39	Av. 1940–45	1946	1947	1948	1949	1950	1951	1952
U. S. A.	485	567	439	539	673	358	406	444	335	383	387	410	430	390	385
Latin America															
Mexico	51	53	82	158	245	197	258	206	187	217	218	258	247	222	244
Argentina	—	—	2	1	4	4	21	25	20	23	24	20	25	27	E 27
Bolivia	1	2	3	11	18	10	17	13	9	12	28	29	34	33	31
Peru	6	3	1	1	21	12	49	53	49	60	53	72	68	91	116
Brazil									—						
Others	—	—	—	—	—	—	1	1	—	4	6	3	4	4	E 4
Total Latin Amer.	58	58	88	171	288	223	346	298	265	316	329	382	378	377	422
Br. Commonwealth															
Canada	19	22	24	64	151	151	201	212	177	162	167	170	194	186	211
Newfoundland	—	—	—	—	3	29	31	28	28	23	22				
Australia	253	197	63	178	211	230	287	251	195	210	229	224	232	217	230
Burma	10	17	41	68	100	83	86	25	—	—	8	—	—	5	—
South Africa incl. Rhodesia	10	4	22	33	27	8	18	14	9	32	43	51	45	53	64
United Kingdom	22	14	10	11	17	40	33	5	3	3	3	2	3	5	4
Other (India)	—	—	—	—	—	—	—	—	—	—	1	1	1	—	—
Total Br. Common.	314	254	160	354	509	541	656	535	412	430	473	448	474	466	509
Far East (incl. China, Japan, Korea)	4	11	4	3	4	10	25	27	5	8	8	11	12	15	20
Western Europe															
*Austria	27	36	4	6	8	7	3	—	1	2	3	5	5	5	5
France	8	3	6	8	8	5	6	5	9	8	8	11	12	12	12
Germany	83	80	55	36	60	60	89	72	17	16	25	45	50	56	57
Greece	20	9	2	5	6	7	5	1	1	1	1	2	3	5	E 5
Italy	30	24	30	23	34	25	41	25	15	26	33	39	42	43	43
Spain	201	182	(S 21) 137	140	150	95	34	37	42	34	30	32	42	43	48
Sweden	2	2	1	2	5	7	10	14	23	23	26	26	26	17	18
Total W. Europe	371	336	235	220	271	206	188	154	108	110	126	160	180	181	188
Eastern Europe															
Czechoslovakia	—	—	—	—	7	4	4	2	2	6	6	E 6	E 7	E 7	
*Poland			1	11	14	8	4	—	12	14	19	20	20	E 20	E 32
Rumania	—	—	—	—	—	3	7	—	4	4	E 5	E 5	E 5	E 5	
Yugoslavia			4	8	13	55	84	14	48	57	62	80	94	87	90
U. S. S. R.	2	1	1	1	3	22	66	82	79	88	94	99	132	175	203
Total E. Europe	2	1	6	20	37	92	165	99	145	169	186	210	258	294	325
Africa—Ex. Br. Com.															
Algeria						3	4	1	1	1	1	1	2	3	5
Fr. Eq. Africa								4	3	3	3	1	2	3	3
Fr. Morocco	18	15	16	33	38	8	19	13	12	24	33	41	53	75	87
Tunisia						10	13	9	10	14	15	17	21	23	25
Other						9	7	2	1	—	—	—	—	—	—
Total Africa Ex. Br.	18	15	16	33	38	30	43	29	27	42	52	60	78	104	120
Other	—	—	—	—	—	—	6	—	4	—	—	—	—	—	4
World Total	1,252	1,242	948	1,340	1,820	1,460	1,835	1,586	1,301	1,458	1,561	1,681	1,810	1,812	1,973

(S)—Smelter production. (E) — Estimated

*—1938–1945 Austria included with Germany. 1940–45—Poland included with Germany.

1913–1929—Europe, Africa ex Br. Emp., India—"Int. Control in Non-Ferrous Metals."

1930—Europe, Africa, India—ABMS.

On the other hand, remarkable increases have been registered by Latin America, by Eastern Europe and by Africa (outside the British Commonwealth). These latter three areas have increased their total mine production from 363,000 short tons (20% of the world total) in 1925-29 to 867,000 short tons (44%) in 1952.

Thus the world's constantly expanding requirements of lead are being met less and less by formerly major sources of supply and more and more by newly developing sources.

The most interesting development of needed new supplies in large volume, however, seems to have come from reclamation of secondary lead.

The world's total recovery of secondary lead, as shown, is necessarily on an estimated basis. Official figures have been published for the United States for the whole period 1913-52 and for U.K. since 1942. They are derivable for U.K. for prior years and for Japan since 1940. The yearly rate of recovery in U.S.S.R. since 1936 has been estimated in a recent study published in U.K. (c.f. Metal Bulletin, March 20, 1953). It is assumed, for this study, that recovery throughout Western Europe has been approximately equal, year by year, to that in U.K. With liberal allowances for the probable inaccuracies contained in such a basis of estimation, increases in the rates of recovery of secondary lead seem to have been

approximately as indicated in the accompanying table.

Estimated Recovery of Secondary Lead

Thousands of Short Tons

	Av. 1913–14	1952	% Increase
U. S. A.....	67	440	557%
World Outside U. S. A.....	122	512	320
World Total	189	952	404%

During the entire period the world's total mine production has increased by 58% and the world's total industrial use of lead by 115%.

Meeting Future Requirements

As compared with 1952, future industrial requirements of lead are also indicated on an accompanying table.

Estimated Future Industrial Requirements of Lead

Thousands of Short Tons

	1952	1960	1975
U. S. A.....	1152	1260	1450
World Outside U. S. A.....	1625	1740	1900
World Total	2777	3000	3350

The U.S.A. and U.K. together held in stockpile about 800,000 short tons of lead at the end of 1952. It is known that other countries, e.g. Argentina, have been accumulating stockpiles on a more modest scale, and it is probable that U.S.S.R. and her satellites have been accumulating to the extent that circumstances have permitted. So it is likely that total government stockpiles throughout the world currently amount to 1-million short tons or more. Practically all have been acquired since 1945, at an average rate of 143,000 short tons per year.

Prospective world industrial requirements call for an increase over the 1952 rate of 573,000 tons by 1975. If it may be assumed that there will be no further additions to, and no appreciable releases from, the various government stockpiles, then the world's mine and secondary sources will need to step up present production by 573,000 less 143,000 (which has been going to stockpiles) or 430,000 tons, an increase of 15%.

The extraordinary increases in recovery of secondary lead since 1946 in U.K., Western Europe and Japan are due largely to the tremendous war damage inflicted on residential and industrial centers in these various countries. It is probable that most of this nonrecurring source of lead has now been dissipated. Normally, the amount of secondary lead available in any country depends upon the amount of lead that has been put to use industrially during the previous ten years. That is, about 75% of lead used in automobile batteries becomes available as scrap after about three years of use; 33% to 60% of lead used for cable covering, buildings, bearing metal, solder, typemetal, calking and certain other uses becomes available as scrap after about 10 to 20 years of use. It is not likely that prospective peacetime sources of secondary lead in these countries will support a recovery larg-

Table IV. Operating Costs of Thirteen Lead Mining Companies in Six Countries

	Av. 1936–39	Av. 1940–45	Av. 1946–50	1951	1952
Four U. S. A. Companies representing, of U. S. A. total mine production of lead, 55% in 1936–39 and 42% in 1952, showed Total Costs per pound of Metal Produced—					
Before Taxes	4.03 c.	5.31 c.	8.47 c.	10.17 c.	12.14 c.
After Taxes	4.18	5.80	9.87	13.90	13.41
One Canadian Company representing 85%-88% of Canada's total mine production of lead, showed Total Costs per pound of Metal Produced—					
Before Taxes	2.20	2.33	2.72	6.30	8.69
After Taxes	2.56	3.00	5.47	10.79	11.54
The Mexican Companies representing, of Mexico's total mine production of lead, 21% in 1936–39 and 19% in 1952, showed Total Costs per pound of Metal Produced—					
Before Taxes	2.50	5.30	9.42	14.44	11.71
After Taxes	2.62	6.08	11.25	17.82	15.16
Various Australian Companies representing, of Australia's total mine production of lead, 69% in 1936–39 53% in 1940–45 81% in 1946–50 83% in 1951 45% in 1952, showed Total Costs per pound of Metal Produced—					
Before Taxes	2.88	3.90	11.44	16.93	12.05
After Taxes	2.99	4.26	12.56	18.65	14.80
One Rhodesian Company representing, of South Africa-Rhodesia total mine production of lead, 42% in 1946-50 30% in 1951 22% in 1952, showed Total Costs per pound of Metal Produced—					
Before Taxes*	.....	.....	4.75	1.08	7.91
After Taxes*	.....	.....	8.00	8.65	11.73
*(After crediting revenue derived from large by-product recovery of Vanadium)					
One Argentine Company representing over 85% of Argentina's total mine production of lead, showed Total Costs per pound of Metal Produced—					
Before Taxes	2.95	6.28	11.05	16.32	12.88
After Taxes	2.95	6.37	11.90	18.02	14.68

er than has been seen during the past few years. In the U.S.A. secondary recovery in the neighborhood of 500,000 tons per year many be anticipated.

Thus, world total recovery of secondary lead by 1975 will probably be in the neighborhood of 1-million tons per year (952,000 tons in 1952). Increased industrial requirements therefore will need to be drawn mainly from the world's mines and from this source production will need to be increased by 22% over 1952. It is apparent, however, that mine production of lead in U.S.A. is on a long-term downward trend (cf Chart I), and the probability is that by 1975 it will be supplying less rather than more than the 385,000 tons it yielded in 1952. The burden of satisfying future increases in industrial requirements of lead (430,000 tons) must be borne, therefore, by mines outside U.S.A. Prospective necessitous increases from these sources by 1975 are on the order of 27%, a sizable expansion during the next twenty-three years. During the twenty-three years 1929-1952, mines outside U.S.A. increased their production of lead by 28%.

World Lead Reserves

The world's total reserves of lead contained in ore have recently been estimated at 50-million short tons, or about 25 times the 1952 rate of mine production. This is, of course, a very broad estimate. Furthermore, figures on what constitutes reserves can be misleading. Beyond the depletion of known reserves of ore by actual mining operations, and their accretion by exploration and development work, reserves by definition may be increased or decreased by such constantly changing factors as market price, mining and smelting technology, labor and power costs, and by many other factors.

It may not be supposed, therefore, that the 50-million tons of lead presently estimated as contained in existing ore reserves constitute all the lead that will ultimately be available from the earth's crust. At present operating costs and prices 50-million tons may be assumed to be a fair estimate of what is presently available for profitable extraction.

Perhaps a more practical guide toward future increases would be the demonstrated profitability of exploiting any given deposit of ore. Toward determining the most likely sources of increased lead production during the next twenty-three years, a tabulation of the past and present cost of operation of mining properties is in order. All the companies used in the following tabulation are major producers of lead and of zinc, there being nowadays few mines of significant size producing only lead. All the companies used have been in operation, with the exception of one Australian and one Rhodesian company, since 1936 and all have extensive ore reserves on which to base future operating schedules.

Because it would be impracticable to try to separate, in so many cases, overall corporate costs as between lead production and zinc production, the determinant used is the cost of production per pound of metal, that is, of lead and zinc mined.

Most of these companies have other profitable activities than mining, but all sources of income are here considered as offsets to the cost of mining lead and zinc.

Total cost, therefore, is the difference between the average market price of lead-zinc in any one year and the net income per lb. of metal produced by each company concerned. That is, it is the total cost for each company of extracting a pound of metal from its underground ore reserves and getting it to market in finished form.

Taxes Outside the U.S.

Because taxes on profits and other taxes on the mining industry, particularly outside U.S.A., are, and regardless of price will continue for a long time to be, an important part of such costs, their increasing impact during the past sixteen years has been included in this tabulation. All market prices and cost figures are shown as U.S.A. equivalents at then prevailing rates of exchange.

Some producers of large tonnages of lead-bearing ore are excluded from Table IV where the production of copper or other metals has been a more important consideration than the production of lead. Among such companies are Anaconda (copper) in the U.S.A., and Cerro de Pasco (copper, zinc and silver) in Peru.

Although such companies are important in the world's total mine production of lead, they are not directly comparable on a cost per lb. basis with the thirteen companies included in the above tables.

However, if Cerro de Pasco were considered as a lead-zinc producer with revenues from all other products, including copper and silver, credited against the cost of producing lead and zinc, its costs per pound of metal recovered would have been as indicated on the accompanying Table V.

On the basis, then, of considering Cerro de Pasco as a lead-zinc producer with incidental income from other products, Table IV may be expanded to fourteen companies in seven countries.

Apart from Yugoslavia and U.S.S.R. for which production cost figures are not available, it would seem that the countries which possess the greatest reserves of lead-bearing ore rank about as follows with reference to present (1952) operating costs. The lowest-cost countries are listed first.

Lead Producers In Order of Present Operating Costs

Before Taxes	After Taxes
1. Southern Rhodesia	1. Canada
2. Canada	2. Southern Rhodesia
3. Peru	3. Peru
4. Mexico	4. U. S. A.
5. Australia	5. Argentina
6. U. S. A.	6. Australia
7. Argentina	7. Mexico

The tax "bite" per lb. of metal produced in 1952 was highest in Southern Rhodesia at 3.82c. and lowest in U.S.A. at 1.27.

On the basis of present indications, therefore, the countries best situated for increasing production in the future, having in mind both operating costs and tonnage of ore reserves, are Canada, Southern Rhodesia and Peru. Reduction of Australia's present very high tax "bite," 2.75c. per lb. of metal in 1952, would materially enhance possibilities in that country. Also, future increases in Yugoslavia and U.S.S.R. are quite probable.

In the foregoing study of operating costs and taxes there are included operating results of fourteen major mining companies producing lead and zinc in seven countries. Based on the average market prices in 1952 of 16.36c. in U.S.A. and of 17.72c. in London (U.S.A. equivalent), taxes on profits and other taxes on the mining industry in 1952 were per lb. of lead and zinc as listed in the accompanying table VI.

It appears that governments other than U.S.A. levy taxes on their mining industries to such an extent as to about equalize the cost after taxes outside U.S.A. with the cost of producing lead and zinc in U.S.A.

Table V. Cost per Pound of Metal—Cerro de Pasco Corp.

	Av. 1940-45	Av. 1946-50	1951	1952
Total Costs per pound of lead and zinc produced—				
Before Taxes	2.58 c.	9.16 c.	7.96 c.	11.23 c.
After Taxes	3.63	11.32	12.08	13.44

Table VI. Taxes Levied on Major Mining Companies (Based on 1952 Metal Prices) Costs per Pound of Lead and of Zinc

	Taxes	Before Taxes	After Taxes
Rhodesia	3.82 c.	7.91 c.	11.73 c.
Mexico	3.45	11.71	15.16
Canada	2.85	8.69	11.54
Australia	2.75	12.05	14.80
Peru	2.21	11.23	13.44
Argentina	1.80	12.88	14.68
Simple Average ex-U. S. A.	2.81	10.75	13.56
U. S. A.	1.27	12.14	13.41

Table VII. Top Metal Prices During 1952

	U. S. A.	London (U. S. A. Equivalent)	World Average
Lead	19.00 c. (1)	21.88 c.	20.44 c.
Zinc	19.50 (2)	23.75	21.63
Average	19.25	22.81	21.03

(1) At New York. (2) At St. Louis.

Table VIII. What Price Lead Information available since the beginning of 1936 indicates the world's lead position to have been:

	Supplies	Thousands of Short Tons
Jan. 1, 1936	Refinery Stock U.S.A. (Assuming same percentage relationship to Industrial Use as in U.S.A.)	222
	Refinery Stocks outside U.S.A. Est.	578
	World Total Refinery Stocks Est.	800
1936-1952	Mine Production of Lead	28,431
	Recovery of Secondary Lead	12,088
1936-1952	Total Lead Available (17 Years)	41,319
1936-1952	World Total Industrial Use of Lead	40,334
Dec. 31, 1952	Refinery Stocks U.S.A. (Assuming same percentage relationship to Industrial Use as in U.S.A.)	44
	Refinery Stocks Outside U.S.A. Est.	110
	Held in Government Stockpiles Est.	1,000
	Total Disposal of Lead (17 years)	41,488

As pointed out, all of these fourteen companies are well-established, major producers operating on substantial ore deposits. They are all versed, through years of operating experience and financial competence, in the most efficient and modern operational equipment and technique. They required an average price of 13.53c. a pound each for lead and zinc to just break even in 1952. Actual market prices during 1952 were 16.36c. U.S.A. and 17.72c. London, or a world average of 17.04c. The difference between "break even" and actal market price was 3.51c. per lb., representing average net income after taxes for these best established companies. Together, in 1952, these companies produced 35% of the world's total lead mine production outside the Iron Curtain Countries. Presumably, 65% of the world's production outside the Iron Curtain required an average price higher than 13.53c. per lb. each of lead and zinc to just break even. The top prices during 1952 are shown in the accompanying Table VII.

At those prices *some* marginal producers were just breaking even. Thus, with 35% of production requiring 13.53c. and 65% requiring 13.53-21.03c., it may be estimated on a reasonably conservative basis that the world's lead-zinc mines required an average price of 15.00c. per lb. each of lead and zinc to break even during 1952.

Present average prices (average of lead and zinc per lb. as of October 1953) are:

U.S.A.	11.75c.
London (U.S.A. Equivalent)	10.40
World Average	11.08

indicating generally unprofitable operations. Actually U.S.A. mine production of lead in the first nine months of 1953 has shown a decline of 12% as compared with the corresponding months of 1952.

During 1952, lead mines outside U.S.A. produced 1,588,000 tons of lead at an average market price of 17.72c. (U.S.A. equivalent of London price) per lb. each of lead and zinc, and at an average cost including taxes of about 15.00c. In order to meet increasing world requirements, these mines will need to be producing at the rate of 1,975,000 tons by 1975. Their present average market price is 10.40c.

It seems unlikely that these future requirements will be prepared for and met at an average market price of less than 15.00c. per lb.

Presumably, refinery stocks of lead, so burdensome in pre-war days, have been largely transferred to government ownership. Refiners themselves probably had no very burdensome stocks at the end of 1952. Their stocks now amount to less than one month's industrial requirements. Government stockpiles (estimated world total) are equivalent to a little over four months' industrial requirements. Ultimate disposal of these stockpiles will have a definite but probably only a temporary, effect on the rising trend of world prices.

Over the longer term, the world's increasing industrial requirements must be met by increased mine production outside the U. S.

Editor's Note:

This article is the first of a series of close-ups of different occupations in the mining industry. Our first close-up takes a look at the General Superintendent's job in an open pit mine. We wish to thank Mr. Begor for consenting to be our first subject, and to thank National Lead Co. and Mr. Paul Allen, general manager at Tahawus, for their kind cooperation.

CHARLES R. BEGOR JR., General Superintendent at National Lead Co.'s Tahawus (N. Y.) mine

E&MJ Visits the General Superintendent at . . .

U.S.' Largest Titanium Mine

JOHN H. KEARNEY
News Editor

GEORGE P. LUTJEN
Associate Editor

CHARLES R. BEGOR, JR., is general superintendent of one of the world's largest titanium mines, National Lead Co.'s open-pit operation at Tahawus in upstate New York.

The son of a miner, Begor, now 40, grew up in the industry and has worked at most jobs around mines. His first mining job, at the age of 16, was helping to install an electric hoist. That was at the Witherbee-Sherman Corp. property at Mineville, N. Y., which is now owned and operated by Republic Steel.

Born in Moriah Center, Begor has spent all of his life in New York's Adirondack region except for 1932 when he studied engineering at Bliss Electrical School in Washington, D. C.

After a variety of mining posts, he joined National Lead Co. at Tahawus in 1945 as assistant maintenance superintendent.

Seated in his sun-lit office recently, he briefly sketched the history of the workings at Tahawus for visiting *E&MJ* editors.

"Iron ore was first discovered by white men in this vicinity in 1826. The presence of large quantities of titanium in the ore was held to be detrimental because it increased the difficulty of extracting the iron," Begor said.

"The property was untouched," he continued "from 1913 until 1941 when it was taken over by the National Lead Co."

"In 15 months from the start of construction," Begor recalled "ilmenite concentration began to flow. Titanium had become an important mineral and iron is now a co-product here."

Begor reports to Paul Allen, plant and the shops. Recently *E&MJ* assistant. Begor's duties include, along with a raft of paper work, daily visits to each department. Before his day is finished he has visited and talked with key men in the mines, the mill, the sintering plant and in shops. Recently *E&MJ* spent a typical day with Charles Begor, and by way of our camera, invite you to take the tour with us.

1. BREAKFAST with his wife Helen starts Begor's day. Usually he is at his office by 6:30 am although the office day runs from 7:00 to 3:30.

Please turn the page.

2. OPEN PIT at Tahawus yields 5,000 tons of ilmenite-magnetite ore plus 8,000 tons of waste rock daily.

Mine Has Two Products

LENTICULAR SHAPED VEINS of closely associated magnetite and ilmenite, separated by waste zones and inclusions make up the orebody. Deposit is about 1,800 ft. long, has maximum width of 900 ft. A band of waste runs along longitudinal axis and production must be obtained in nearly equal amounts from ore on both sides of it, since the ore on one side is more refractory and must be blended for economic recovery. Fourteen 15-ton and five 22-ton trucks do the hauling.

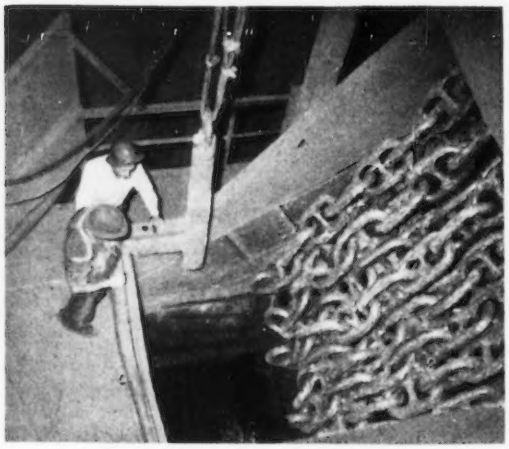
3. MAP is used by Begor to check progress after morning chore of scanning daily reports.

Mill Is Wet and Dry

RUN OF MINE ORE is crushed to 7/16 in. in three stages. Crushed ore is screened and plus 7/16 material is run over magnetic pulleys where low grade is rejected and magnetic material is returned to crushers. Four 6 x 12 Marcy open-end rod mills in closed circuit with 28-mesh vibrating screens produce feed for wet magnetic separators. Low intensity magnets remove a magnetite concentrate which is then dewatered, deslimed and sent to the sinter plant.

Ilmenite-bearing tails from the operation above, are graded into 8 sizes ranging from 20- to minus 150-mesh, by four hydrosizers. Ilmenite is concentrated on shaking tables, dewater and dried. Wetherill machines magneticaly remove any remaining magnetite which is returned to the wet mill. Final ilmenite cleaning is made by high intensity magnets.

Mill produces 2,000 tons of magnetite concentrates and 1000 tons of ilmenite concentrates daily.

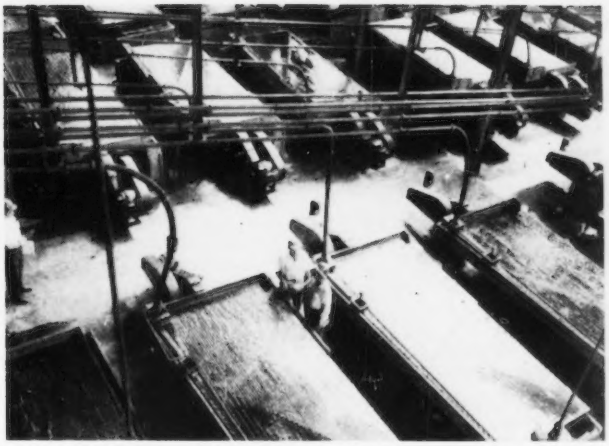


7. PRIMARY CRUSHING is done by 300 tph, 48 x 36-in. Birdsboro jaw crusher. Begor shows operator where to use hanging weight on hang-up in jaws.

4. ORE OR WASTE? Shovel near center of mine could be loading either so Begor (left) and Dick Solburg, mine superintendent, check with operator. For truck drivers, he'll blow horn once for ore load, twice for waste. The shovel, one of four, is a 4-yd P&H with Magnetorque.

5. ATOP WASTE DUMP, Begor towers above 80-ft. trees in valley, which will eventually be filled in by advancing waste. Company's full time forester supervises removal of valuable timber before it is lost under rock.

6. DROP-BALL is 4 tons of mild steel. It can smash 150 boulders a day, thus eliminating secondary blasting. Being considered is a hard face alloy tip for the ball.



8. IN WET MILL with John Strohl (left), mill superintendent, Begor examines ilmenite concentrate on one of 88 Deister Plat-O shaking tables.

9. IN DRY MILL, Strohl and Begor confer before a Wetherill machine that cleans any remaining magnetite from ilmenite concentrate.

10. SINTER PLANT can be fed from magnetite stockpile (right foreground) or directly from wet mill.

11. SINTER PAN draws attention of Begor and assistant sinter superintendent, Ralph Biche.

Sinter Plant

THREE 10 x 25-FT. SINTERING PANS at sinter plant can produce 2,100 tons of sinter in 24 hours. Two fans pull 30,000 cfm air through the beds. Return fines (minus one inch sinter) are screened out as sinter is loaded into railroad cars.

Feed for sinter pans is approximately 61% magnetite, 4% coal culm, and 35% return fines. These are mixed in pug mill and moisture brought to 5%. An electrically operated charge car, fed from surge bin, spreads a one inch hearth layer and a 10-in. feed layer in each pan. After ignition, each bed sinters in approximately 13 minutes.

15. NEW COURSE for Hudson River is indicated by arrow where ⅓ mile long canal will be dug.

Tailings Disposal

PRESENT TAILINGS DISPOSAL facilities at Tahawus are in a sheltered bend of the Hudson River, well isolated from the stream's course. To enlarge them, the river will soon be diverted by digging a ⅓ mi. canal through a neck of land jutting into the river. The entire present width of the river can then be made available for tailings disposal.

16. OLD TAILINGS POND, left, will be enlarged to entire river width by new canal.

12. HARDFACING job on dipper teeth is shown to Begor by Maint. Supt. John Zollinger.

13. UNDER A EUCLID Begor queries Zollinger as to how soon his men will have the truck rolling.

Maintenance Is a Must

KEEPING A LARGE OPEN PIT mine in operation throws a lot of responsibility on the maintenance department. At Tahawus, a good preventive maintenance program with periodic checks of all vehicles and other mechanized equipment has cut down considerably on repair bills.

Rebuilding wearing parts by hardfacing is a big item and an extensive welding shop is kept busy. Churn drill bits are another big item. Uniformity in bit hardening operation has been accomplished through the use of a salt bath heat treating furnace.

Begor was formerly maintenance superintendent.

14. SAFETY RECORD of maintenance department is highlighted by novel sign in the shop.

Tahawus, N. Y.

BEFORE 1941, Tahawus wasn't even a wide spot in the road. In fact there was no road. There was a Tahawus on the map but it was a few miles from the present town, and only a cabin or two of the old Tahawus remains. The present town, near the mine, at the end of the all-weather road National Lead had to build, is considerably larger, but most shopping is still done in nearby towns.

17. HEADWATERS of the Hudson are near Tahawus. At least, this is just above the first point where there's enough water to call it a river.

18. HOME is a matter of half mile drive from the office. The company provides a comfortable, 5-room house for which Begor pays a nominal rent. All told, National Lead has facilities for housing 180 families and about 160 single men in the townsite at Tahawus.

19. PRIVATE ARSENAL of hunting rifles is kept in cherry wood cabinet built by Begor. He has enjoyed hunting from early boyhood.

Tahawus Area is Ideal for Outdoor Hobbies

BECAUSE HUNTING AND FISHING are his favorite hobbies, Charles Begor is more than content in the Adirondack Mountains. Taking advantage of the nature of the country, National Lead has provided camps on its property for the employees' use and gives them hunting privileges. In town the company also provides a YMCA, theater and athletic fields. Beaches are handy at nearby lakes.

Says Begor, "Its really fine living in the Adirondacks!"

20. BOW AND ARROW are relatively new hunting weapons for Begor but he gets in a lot of practice on target set up in his backyard.

21. CIGAR, slippers and easy chair are a good basis for an evening's relaxation. It's well earned rest, but another day starts at 5:40 am.

SIX-LINE BILLY HIGDON and his albino horses, at the Knott Farm at Buena Park, Calif. Billy was nominal winner of the burro race.

The Great Pack-Burro Race at Death Valley

By ATHA ALBERT RICHIE
Rialto, Calif.

THE "ANCIENT AND HONORABLE Brotherhood of the Diamond Hitch" seldom gets a chance to show its talent, but when it does, a good time is had by all. I remember well the third annual Forty-Niner celebration at Death Valley, which I was fortunate enough to attend in November 1952.

A couple of days before the start of the program, one Bill Higdon (Six Line Billy), of the Knott Berry Farm at Buena Park, Calif., called me up and asked if I would accompany him and a lady jackass to the celebration, where the Knott Farm had entered her in a burro race. He also asked me if I could still throw a diamond hitch, as that was one of the requirements of entry. I told him that I had not done it for 35 years but that I was sure I could do it without the least bit of difficulty.

L. Burr Belden, of the San Bernardino Sun, who has run a series of more than 50 articles on the history of San Bernardino County, was there to report the event. He estimated the crowd at 34,000 for the three-day show, which was a regular circus—something doing all the time and you could never see it all.

One evening, in a natural theater-like depression, Mr. Belden stood alongside the biggest bonfire I have ever seen and gave a very interesting talk as to how the Manley party was misdirected into Death Valley with such dire results. He had undoubtedly put in a lot of time gathering his data.

In the afternoon the burro race was held at Stove Pipe Wells and it created as much fun as anything pulled off during the show. Senator Charles Brown, who is as much a part of Death Valley as was ever Shorty Harris or Frank McAllister, was one of the judges.

Each of the 15 or 18 entrants was supposed to pack his own jackass, but I know some of them did not. The judges looked them over and awarded premiums for the neatest diamond hitch and then they lined up for the race.

Each contestant was supposed to run his jackass a hundred yards, unpack, make his bed down and then build a fire, bake a flapjack and feed it to his burro. If the burro refused to eat the flapjack, that was significant that it was not well baked and disqualified the contestant.

Six-Line Billy of the Knott Farm was announced the winner, but one of the judges noticed that he had thrown his bed off in two piles and not made it up to crawl into and he was disqualified after being announced as the winner.

Man From 29 Palms

A certain Les Spell, who has really been prospecting for a long time and had a very good and well-trained jackass got the first place in the packing part and second in the race. He is a fine looking and well-bewhiskered man from Twenty-Nine Palms. He put in a lot of time in Colorado and he and I did a lot of reminiscing. Another, more bewhiskered, gentleman, from Apple Valley, got his flapjack off the fire and he tossed it up in the air for a couple of minutes and handed it to the jackass, who took it on at once.

Among the other old-timers there were Pete Osdick of Red Mountain and "Seldom Seen Slim" of Balarat. I almost forgot to tell about Slim. He entered a jackass in the race and, while he has been prospecting around the Panamints for 30 years that I know of, he has done it all in an old, and what I mean is *old*, Dodge. I'm sure that Slim never packed a jackass in his life before. At any rate, when the gun was fired to start the race, Slim did not get 30 feet from the starting line before his pack was under the burro's belly instead of on its back. There was a loudspeaker and the announcer was telling everyone to watch the man from the Knott Berry Farm when he noticed Slim and his predicament. When he started razzing him, Slim got his stuff into his old Dodge and hit the road and did not show up for any more of the entertainment. He just couldn't take it.

Where this "Seldom Seen Slim" could have ever acquired such a soubriquet is beyond me. It has been hanging onto him for 30 years that I am aware of. I once heard him make his famous remark about selling "what you got."

The picture is of "Six Line Billy" Higdon.

I have seen him drive four horses on a high gallop and turn a figure 8 on a piece no larger than an acre. There are but a few reinsmen left in the world at this time who are his equal, in a burro race at Death Valley, or anywhere else.

"Seldom Seen Slim" Says—

"If you have something to sell, sell it. If you can't get what you want for it, take what you can get for it, because by gosh you can't eat them rocks."

BINS AND BIN SUPPORTS are two applications of corrugated steel at Mascot.

Corrugated Steel— The Handy Structural Member

W. N. JOHNSON
Chief Engineer, American Zinc Co. of Tennessee, Mascot, Tenn.

CORRUGATED STEEL MEMBERS and sections have proven very useful in the construction of ore storage and transportation facilities at the Tennessee properties of American Zinc Co. of Tennessee, subsidiary of American Zinc, Lead and Smelting Co. The company operates five mines in this area producing at a rate of 4,000 tons per day. Ore goes to the Mascot concentrator which produces zinc concentrates and by-products of stone, sand, and agricultural limestone. A new slope mine, the North Friends Station mine, is being brought into production in Jefferson County, Tenn.

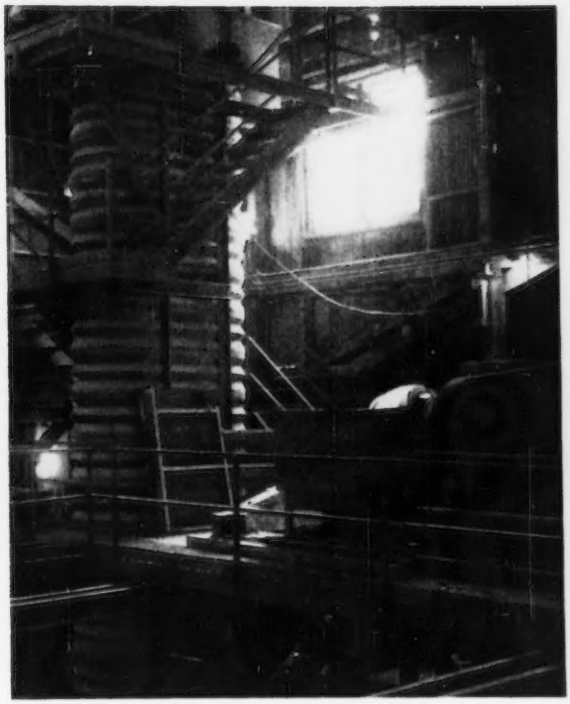
The company first tried corrugated steel as structural members in 1948 when it built two 16 ft. dia. by 20 ft. high storage bins. These structures consisted of corrugated steel bins mounted on corrugated metal pipe columns filled with reinforced concrete. This initial installation proved so successful that corrugated plate has been adopted throughout the Mascot plant. Generally Armco No. 7 gage steel liner plate is used. However, No. 3 gage is recommended for bin sections supporting heavy surcharge loads. Some of the taller bins are reinforced with vertical angles welded to the outside of the bins. All joints are wiped with bitumastic coating before units are bolted together. Other corrugated steel units at Mascot include fumes stacks for the drying plant, belt conveyor housings, and a flume lining for the mill water supply line.

At the new North Friends Station mine, the entry has been built of tunnel liner plates set on concrete abutments. The span is 15 ft. 10 in., and the rise above the 6-ft. abutments a total clear height of 14 ft. Ventilation for the mine is provided through a line of 12-in. Armco spiral welded steel pipe, 1,100 ft. long.

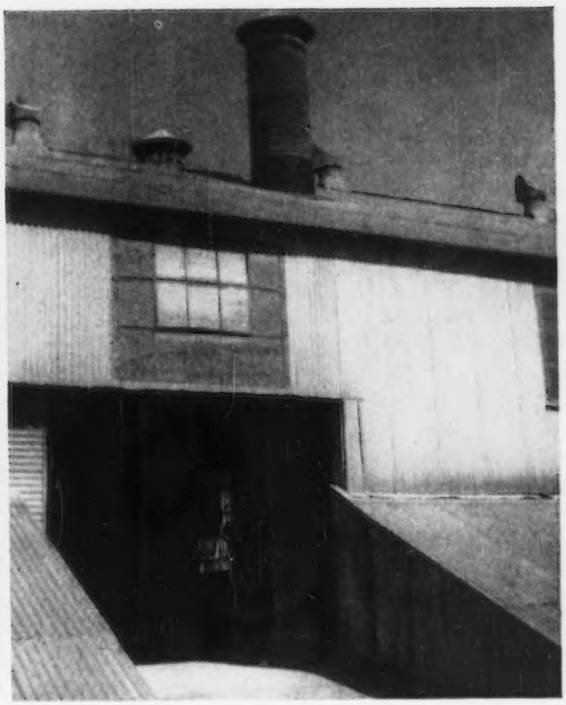
The use of corrugated liner plates has demonstrated these advantages: 1. Simplicity of design. 2. Speedy construction. 3. Can be installed by common labor. 4. Cost compares favorably with that of other types of structures. 5. Units can be dismantled and moved to other properties readily.

American Zinc Co.'s operations are managed locally by Mr. H. A. Coy, general superintendent; William Black, assistant general superintendent; M. J. Langley, superintendent of mines; D. B. Grove, mill superintendent; I. C. Mitchell, superintendent of mechanical and electrical departments; and B. F. Gibson, superintendent of the limestone department.

A simple structural member like this can be a challenge. How many applications occurred to you?

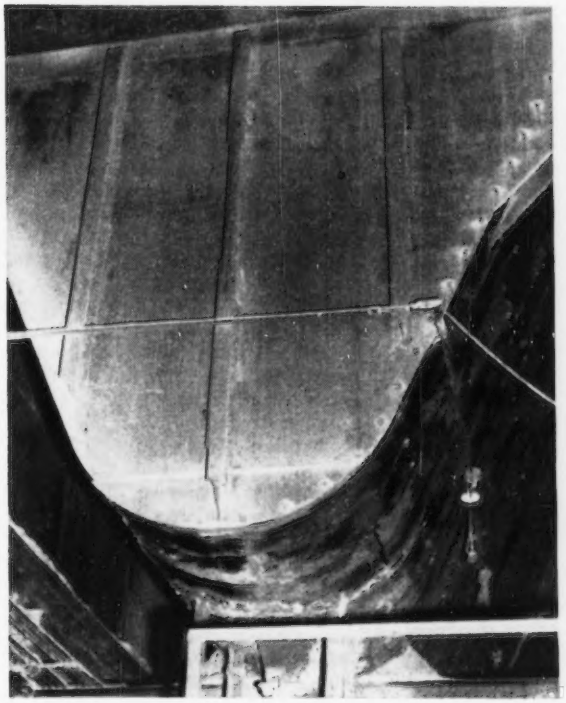


HOUSING FOR BUCKET ELEVATORS. Construction of the housing enclosing this bucket elevator at the Mascot heavy media plant was simplified with corrugated plate.



FUME STACKS. Corrugated sections were assembled and bonded with asbestos to form these fume stacks at Mascot operations of American Zinc Co. of Tennessee

Here Are 4 More Ways to Use Corrugated Sections



SIDE AND BOTTOM OF BINS. Armco corrugated plate serves as an ideal structural material for bin construction at American Zinc Co.'s Mascot jig plant.

TUNNEL LINERS. The portal of the North Friends Station mine is lined with corrugated plates. Diameter of the span is 15 ft. Tunnel height is 14 ft.

CERRO BOLIVAR (mountain at left) rises 1,800 ft. from the Venezuelan savannah. Orinoco Mining Co. has mining rights for mountains on right also but development plans have not been announced.

Iron Ore Shipments from Cerro

ORINOCO MINING CO., U. S. Steel subsidiary, will make its first shipment of iron ore from Cerro Bolivar in January.

First shipments will be made at an annual rate of 2-million tons. Later in 1954, the rate will be stepped up to 5-million tons. An eventual rate of 10-million tons is planned. The ore will be destined for U. S. Steel blast furnaces at Birmingham, Ala., and the Fairless Works, Morrisville, Pa.

To handle ore shipments of this magnitude, Orinoco has had to write a new chapter on materials handling.

Orebody is 4 mi. long and has a maximum width of 4,000 ft., with an average ore thickness of 230 ft. and a maximum proved ore thickness of 550 ft. Ore itself is practically free of sulphur. It is a mixture of hematite, limonite, and a small percentage of magnetite. Average grade (dry analysis) runs about 63.50% iron, with natural iron about 58%. Reserves have been estimated at 500-million tons.

The ore will be mined by two 8-cu. yd. Bucyrus-Erie electric shovels and one 6-cu. yd. Lima diesel-powered shovel. These shovels, operating at three separate locations on 50-ft. benches, will have ample capacity to mine 5-million long tons a year on a single-shift basis.

Drilling will be done with 50-T Bucyrus-Erie churn drills and a Joy Champion Rotary Drill 58-BH with a 7⅜-in. hole. Orinoco officials say that other drilling machinery will be used in the development stage. This additional machinery will include jack hammers, Joy DM-10 or DM-4 drillmobiles with 4-in. diameter bore and heavy wagon drills.

Sixteen 20 cu. yd. LRSW Mack trucks will haul the ore a half-mile to two structural steel loading docks. The trucks will dump directly into ore cars at the docks.

Because mining will be started at the top of the mountain, trucks and rail cars will be running downhill under loads. Braking action is of prime importance.

Truck specifications demand a vehicle which can roll down an 8% grade loaded but under control at any speed under 20 mph. This means using an auxiliary retarding device, independent of wheel brakes. The trucks will be equipped with a 300 hp. Cummins diesel engine, a Twin Disc converter retarder and a Parkersburg Hydrotarder.

Ore cars, built by the Magor Car Corp. of New Jersey, are 4-axled. Capacity is 90 long tons net load and weigh about 250,000 lb. loaded. They are fitted with standard Westinghouse Air Brakes with an additional straight air line. Thus it will be possible to apply the brakes and charge the reservoirs at the same time, providing an added safety factor. This unusual system can be adopted because the ore cars will not be interchanged.

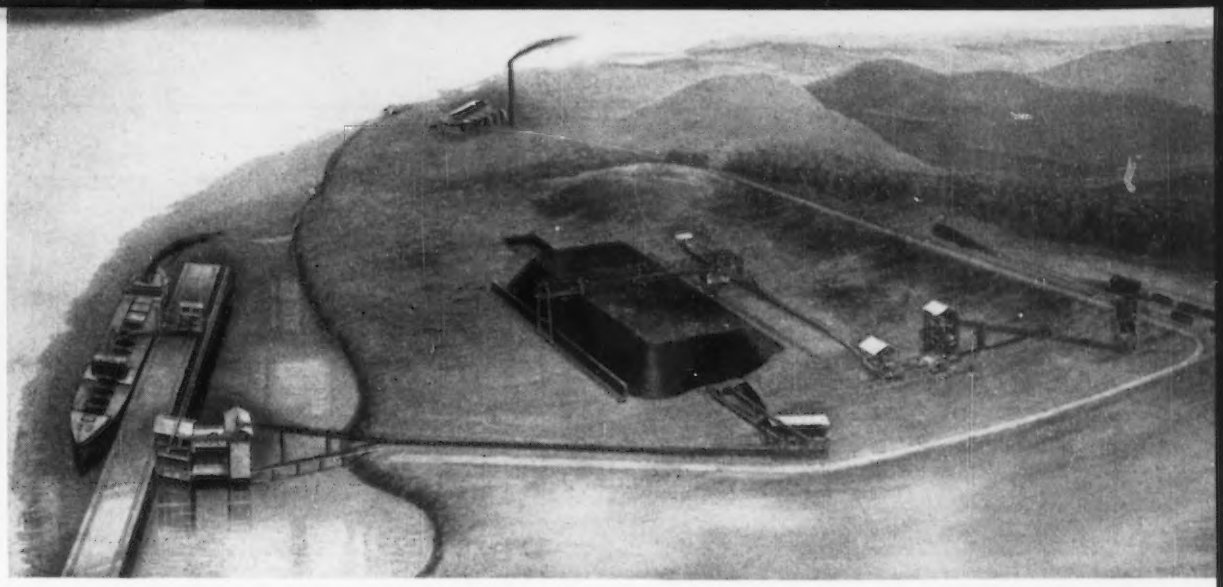
The cars will be moved in 93-car trains at first—later in 123-car trains—from a mountain-top assembly yard. Locomotives are Baldwin-Lima-Hamilton Diesel electric, three-axle trucks, 180-ton, 1600-hp. units. Three units are expected to handle a loaded 123-car train.

Average round-trip running time between the assembly yard at Cerro Bolivar and Puerto Ordaz is calculated at 7 hr., 50 min. Main line rail is 132 lb.; track is standard gage. For economy, Orinoco chose a centralized traffic control system. With this control system and four long passing tracks, capacity will approach that of a double-track road. Two runaway tracks also are provided.

Orinoco has its own high frequency radio system linking Caracas, Ciudad Bolivar, Puerto Ordaz, Cerro Bolivar and along the route from mine to tidewater. The system was designed and installed by the Radio Corporation of America. Experience indicated that radio signals could be used to actuate the centralized control traffic system. Thus costly construction of a 90-mi. wire was avoided.

A power plant has been built at the base of Cerro Bolivar. Two 2500-kw. Nordberg diesel-electric units will produce power for the townsite and for operation of the electric shovels.

At the port, load demand will be



ARTIST'S SKETCH of the ore handling system at Puerto Ordaz which has designed capacity of 1.67 tons per second. Note reclaiming tunnel under stockpile, Link-Belt conveyor system, DeLong docks and the maneuverable shiploader.

Bolivar to Begin Next Month

greater. A steam plant has been built with two 6,000-kw General Electric units and provision for a third. Boilers are oil-fired, rated at 75,000 lb. of steam an hour at 400 lb. pressure and 750 deg. Water will be taken directly from the Caroni River through an intake equipped with traveling screens.

The dock at the rail terminal is located at the mouth of the Caroni River, just above its junction with the Orinoco. Range of river stage is 39 ft. An irregular but sound rock formation underlies the dock site. Dock is designed to support a shiploader weighing 1.5-million lb., plus a deck load of 300 lb. a sq. ft.

What kind of dock to install caused much deliberation. Orinoco finally contracted with the Raymond Concrete Pile Co. which, in turn, signed with the DeLong Engineering & Construction Co. for the fabrication, delivery and erection of the existing docks. The docks were floated from Orange, Texas. (For a full discussion of this engineering feat, see *E&MJ*, June 1952, p. 92.)

Ore handling system at Puerto Ordaz is, essentially, a transfer station. Run-of-the-pit ore is unloaded from mine cars and crushed and stored on the ground from which it is reclaimed as needed and then loaded into the ore boats.

This system was designed, manufactured and built by the Link-Belt Co. and its associates and subcontractors.

Cars coming in to Puerto Ordaz are uncoupled and drifted into a conventional retarder where they are held until withdrawn by a barney haul.

Loaded cars are fed into a single car rotary dumper which handles 67 cars an hour. All functions of the barney and dumper are electrically interlocked and controlled by one operator. Size and speed of the car dumper are considered outstanding. It was built by the Well-

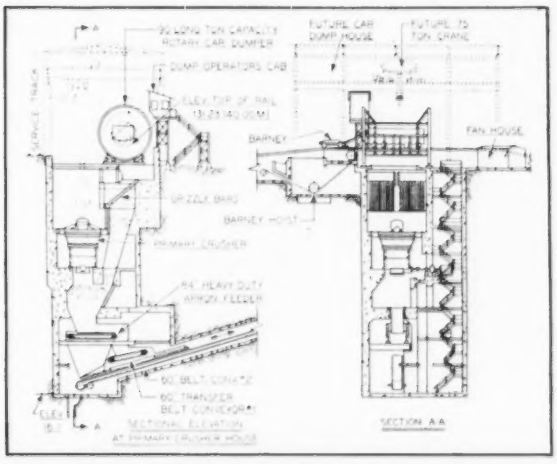


FIG. 1. Rotary dumper handles 67 cars an hour.

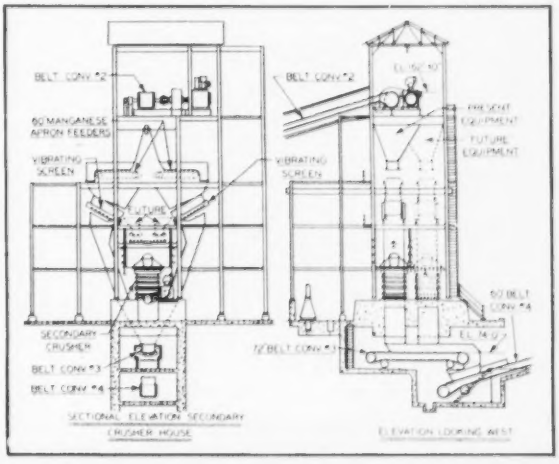


FIG. 2. Secondary crusher produces final product.

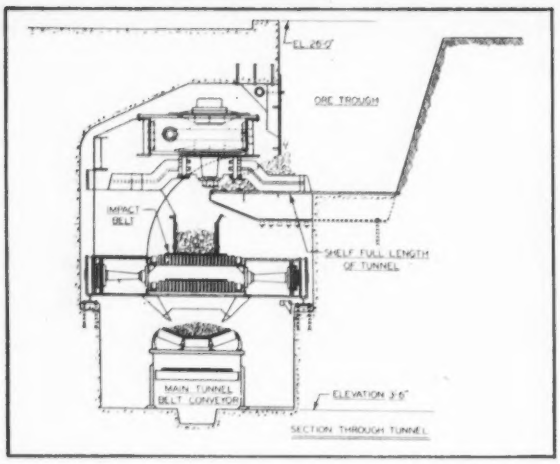


FIG. 3. Tunnel under stockpile aids ore handling.

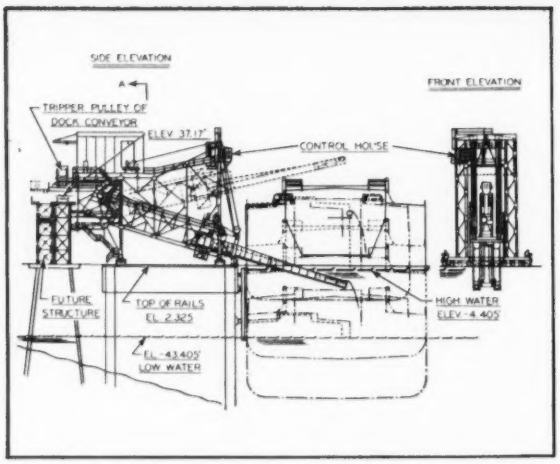


FIG. 4. Ore loader can adjust to 39-ft. tidal variation.

Orinoco's tonnage goal demands this kind of ore handling efficiency

man Engineering Co. and, taking into account the time cycle and the weight of loaded ore cars, it probably is the most rugged ever built.

From cars, ore is discharged to a scalping grizzly set with 9-in. openings (Fig. 1). Oversize flows to a stone box above a 60-in. heavy duty, open bottom gyratory crusher. Undersize from the grizzly joins the minus 9-in. crushed product beneath the crusher where there is space for 2½ carloads. Use of one 60-in. primary crusher for an unloading capacity of 6,000 tons an hour is based on a crusher capacity of 3,000 tons an hour. Only about 50% of the material will pass over the grizzly.

One feeder is used to withdraw the combined grizzly undersize and the crusher product from a common outlet. This provides a uniform feed to conveyor system.

The feeder itself is a steel apron pan type. It is designed to withstand the heavy punishment expected at this point. To protect the crusher eccentric in case the apron feeder is halted, the rotation of the dumper will be stopped automatically and a warning flashed to the dumper operator. The crusher, however, will continue to operate. The massive gyratory crusher was built by Allis-Chalmers and installed in a pit more than 100 ft. deep.

A system of 60-in. wide belt conveyors will handle ore from the primary crushing station to secondary and thence to storage at about 600 fpm. Main inclined Conveyor No. 2 from primary to secondary has a steel cord belt and is driven by a 1250 hp. motor.

At the secondary crushing plant (Fig. 2), the minus 9-in. ore is discharged from Conveyor No. 2 into a surge and distribution chute. From here it is fed uniformly by manganese apron feeders to each of the four scalping screens ahead of the crushers.

This secondary crushing plant is designed to produce a final product, 85% of which will pass between bars spaced at 5-in. clear openings. Maximum capacity is based on not more than 40% plus-5-in. material passing to the two 30-in.x70-in. crushers. Final product then goes to ground stockpile.

Other outstanding features of the ore handling system include:

Reclaiming tunnels (Fig. 3) under the stockpile, with continuing slot and the rotary plows for feeding to conveyor belts;

Continuing sampling system which takes off the belt 60 tons per hour and reduces this to a 5-lb. sample per hour;

Avoidance of hoppers and use of apron feeders with transfer belts to provide more uniform belt loading and better performance.

Use of a dc variable voltage system from reclaiming tunnels to shiploader for completely interlocked, variable speed operation.

The shiploader (Fig. 4) is versatile. Ore is received on a short 60-in. wide transfer conveyor. From here it is discharged to the upper of two 72-in. wide conveyors, both of which are mounted on a common pivoted boom.

When conditions warrant, the lower shuttle conveyor may be extended to trim the hatch of the largest boat or retracted to clear the dock face. The boom may be raised and lowered through an arc suitable for loading small boats at low water or the largest anticipated carriers at 40-ft. higher water levels. Trucks on standard-gage tracks and the traversing mechanism are similar to those used for ore bridges. They are powered by direct current to provide a top speed of 200 fpm for moving from hatch to hatch.

Another obstacle which faced Orinoco Mining Co. was the deepening of the waterways. It was necessary that the largest boats, fully loaded, could navigate freely at low water over the 154 nautical miles from Puerto Ordaz to Caribbean tidewater.

In November 1951, Orinoco negotiated a contract for the necessary dredging with Gahagan Overseas Construction Co., which had made a preliminary survey, and the McWilliams Dredging Co.

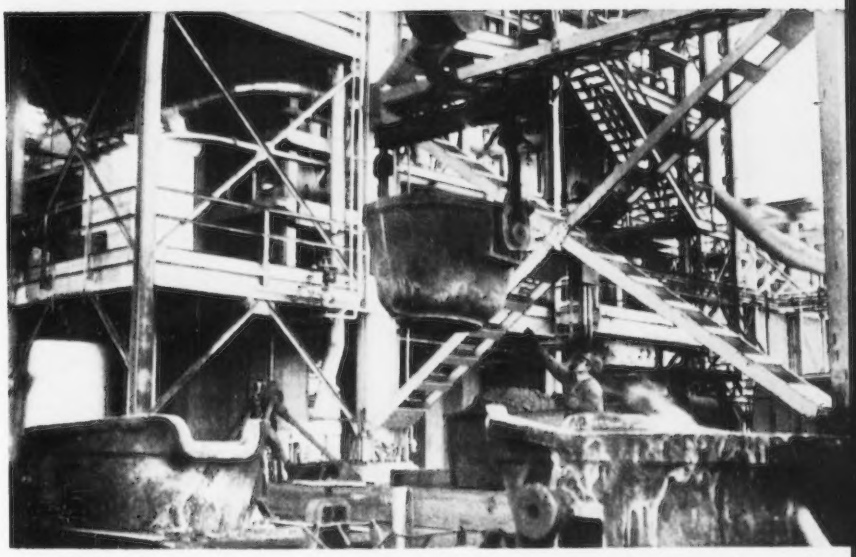
Contract provided for Gahagan and McWilliams firms, as co-venturers, to dredge a channel from Puerto Ordaz to the sea. The dredging companies also were to provide a 26-ft. depth at low tide and 250-ft. width, widening to 400 ft. at the mouth of the river.

First vessel to use the new route navigated downstream light from Puerto Ordaz last July. Since, it has been a supply route for loaded vessels chugging upstream.

Bechtel International Corp. was engaged from the start as construction manager.

For a full discussion of the discovery, extent and type of orebody at Cerro Bolivar, see E&MJ, August 1950, p. 72.

Slag Fuming at Selby



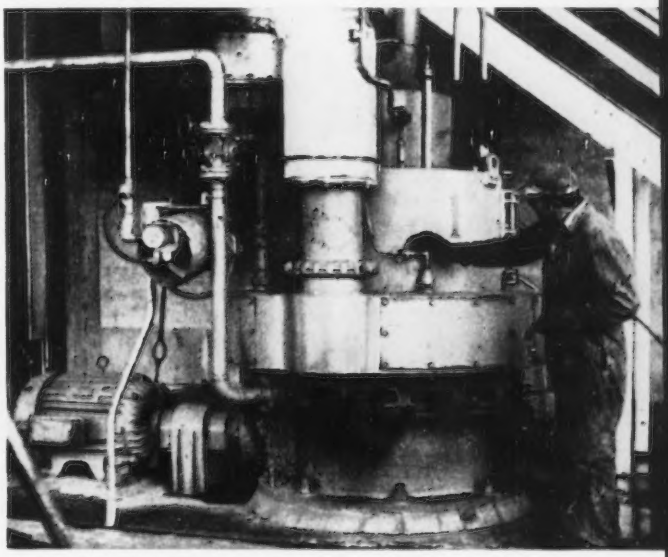
1 FUMING FURNACE, 12 ft. long, 8 ft. wide, 21½ ft. high, is charged with seven 3½-ton pots of hot slag from lead furnace plus cold slag. Feed averages 11.5% Zn, 0.7% Pb, 23.5% Si, 21.5% CaO, and 30.5% iron oxide.

ADVANCE DESIGN with automatic electrical controls is largely responsible for the success of the new slag fuming plant at American Smelting and Refining Co.'s Selby smelter in Contra Costa County, Calif. Going on stream April 21, 1953, Selby, at full capacity, can treat 350 tons of slag a day. This total includes 250 tons of hot slag from current operations, and 100 tons reclaimed from the dump. Annual output of de-leaded, densified zinc fume, assaying 78% zinc and less than 1% lead, is estimated at 13,500 tons, equivalent to about 10,400 tons of zinc metal.

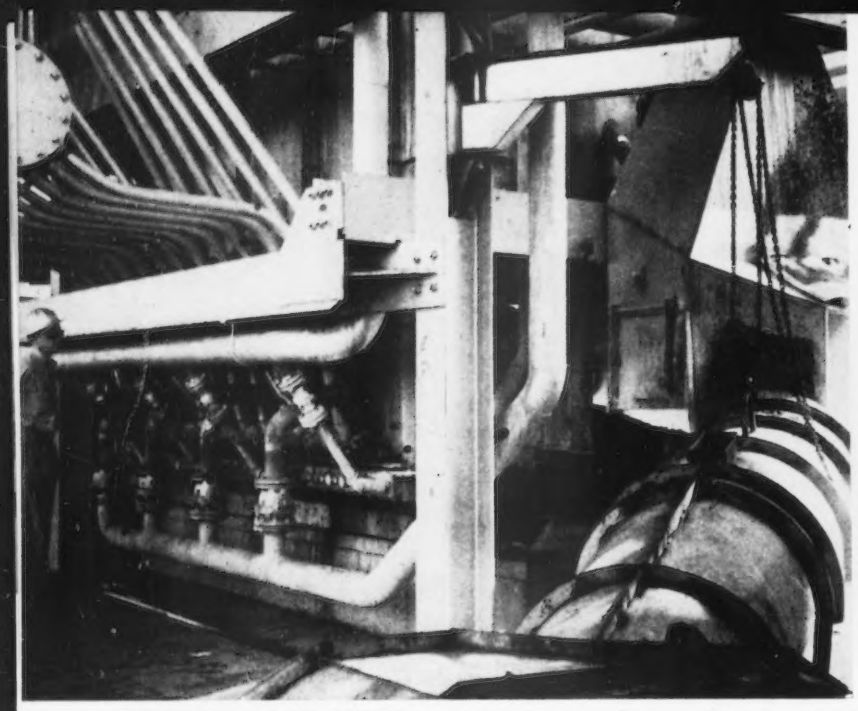
Recovering lead and zinc from blast furnace slag, by blowing air and pulverized coal through the molten slag, was first suggested to Anaconda Copper Mining Co. in 1926 by U. A. Garred. Testing of the process at the Tooele smelter was followed by erection of a plant at East Helena, Mont., to treat high zinc slag from AS&R's nearby lead smelter. Success there led to installations at Trail, Tooele, El Paso, Chihuahua and Selby.

At Selby, coal and air are continually supplied through the 24 double inlet tuyeres, 12 on each side of the furnace. Coal is delivered to the tuyeres from the pulverizers directly in a primary air stream comprising about 48% of the air flow. The remaining 52% enters the tuyeres as secondary air. (*Please turn page*)

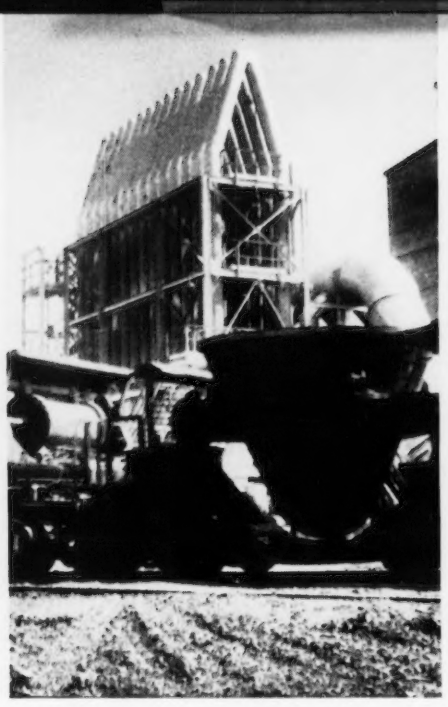
2 THREE-STAGE BLOWER driven by 800-hp. motor supplies 10,000 cfm. air at 14 psi. for furnace operations. Three preheater units heat air going to coal pulverizers.



3 COAL to be blown through slag is pulverized in 2 B&W pulverizers after being crushed to ¾ in. in a 24 x 20-in. Jeffrey hammer crusher. Utah coal is used.

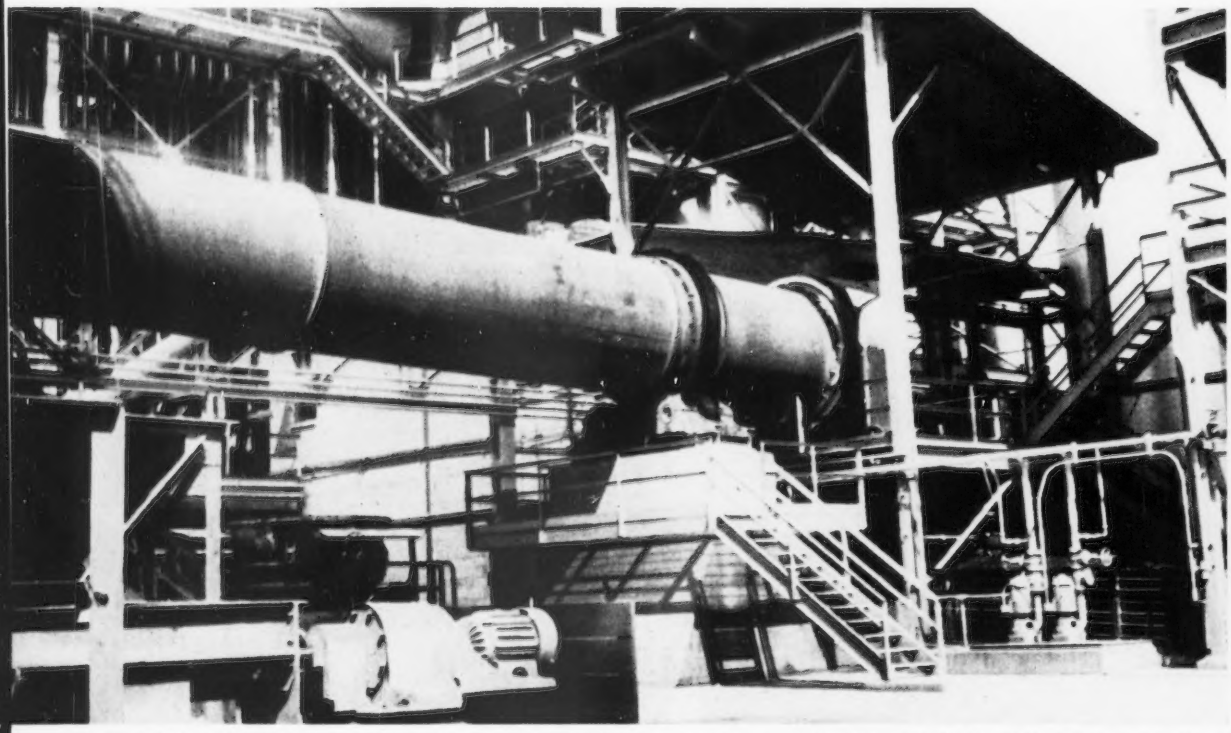


4 DOUBLE INLET TUYERS extend 7-in. into furnace. Slag is tapped through two 5-in. water-jacketed tap holes. Treatment cycle is 105 min.: 30 to 40 min. charging; 60 min. blowing; remainder for tapping.



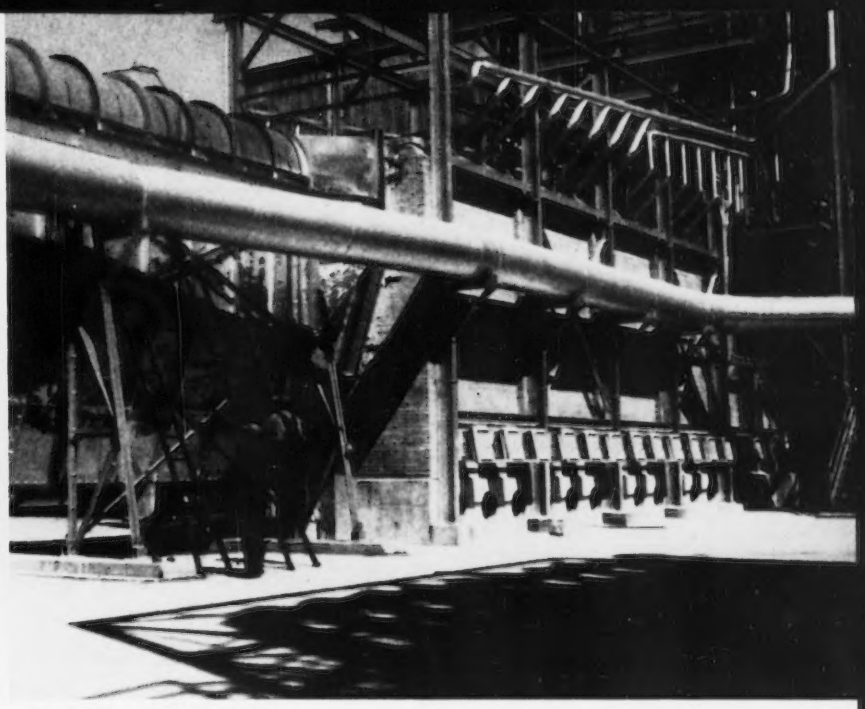
5 FINAL SLAG from fuming furnace, containing about 1.5% Zn, is tapped into 30-ton ladles and tram-

Slag fuming adds more than 10,000 tons of zinc a year to



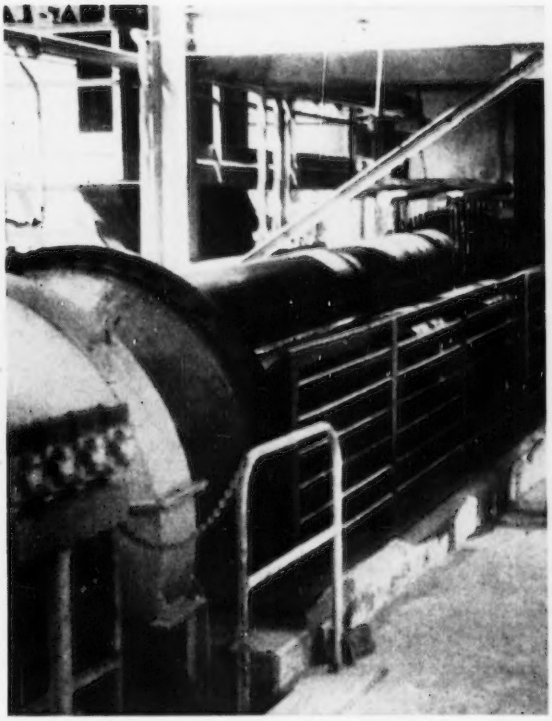
7 DE-LEADING KILN, 7 ft. in diameter, 75 ft. long, treats dust from balloon flue, cooling units, and baghouse. With addition of 1% coke breeze, lead is volatilized and drawn off through U-tube cooler to baghouse. Dust recovered there (45% Pb, 10% Zu) is pugged and returned to smelter. Kiln temperature is automatically maintained at 2300 deg. F. by radiation pyrometers focused on the zinc-bearing clinker at the point of discharge.

med to the slag dump. U-tube coolers (background) with fourteen 24-in. x 37-ft. tubes, cool gases.

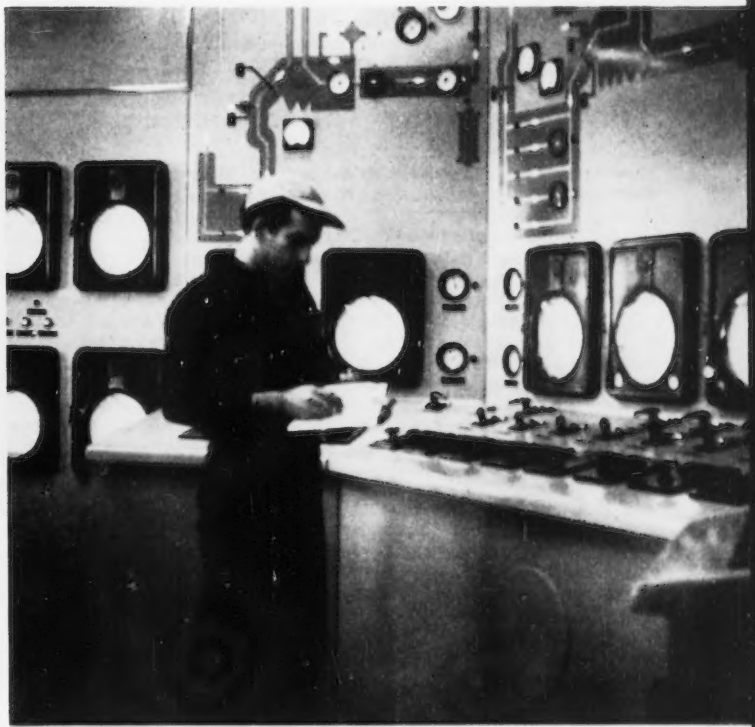


6 METAL VAPOR, oxide fume are carried from furnace by combustion gases to this brick-walled spray chamber. From here, gases go through 8-ft. balloon flue, U-tube coolers, 9 unit Labbe cooler to baghouse. (2300 to 200 deg. F.)

Selby's production

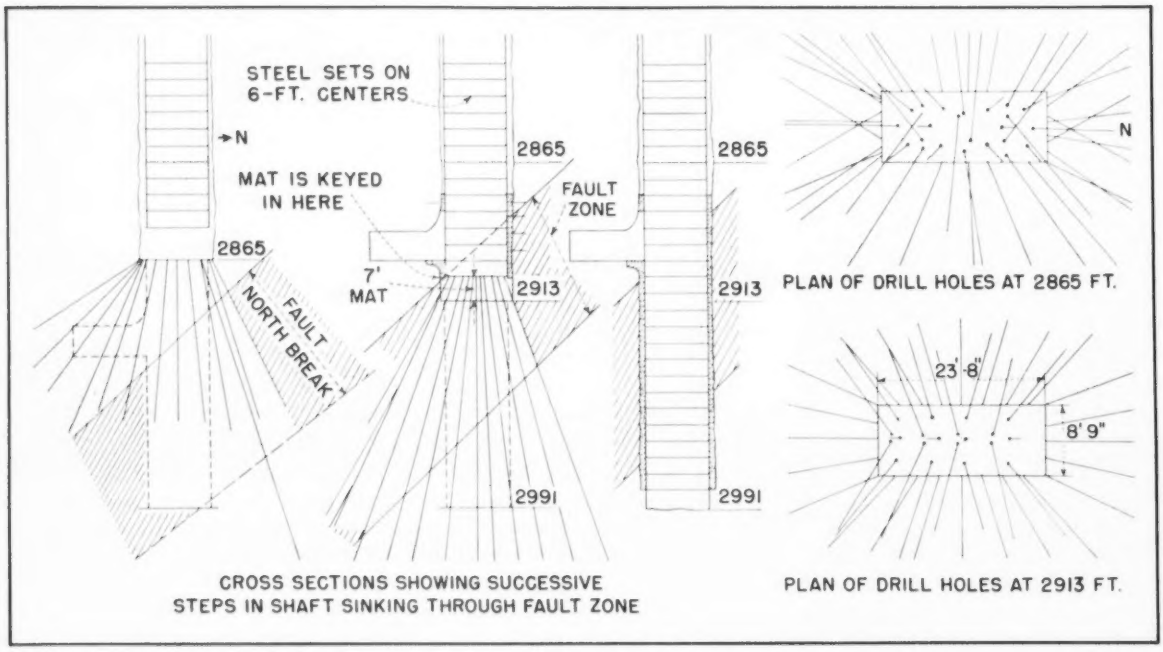


8 SIX-TUBE COOLER cools densified fume containing 78% Zn. This is crushed and screened to minus ¼ in., and loaded into box cars from storage bins for shipment to retort smelters.



9 CONTROL PANEL gives operator visual information on operating conditions everywhere in plant. From this dust-proof room, operations can be adjusted and set conditions maintained manually or automatically. Bailey Meter Co. designed instrumentation.

KEEPING TAB ON PRACTICE



WHEN EXCESSIVE WATER FLOW was encountered cement covers were poured in the bottom. These were drilled as shown above and injected with cement and/or sodium silicate and calcium chloride.

Tsumeb Sinks Concrete Shaft Through Strong Water Channel

MODERNIZATION of the Tsumeb Corporation Limited operations, South West Africa, was described in detail in *E&MJ* November 1953. Frank Pickard, formerly mine superintendent of Tsumeb, now Mining Sales representative, Societé Gregg d'Europe, S.A., of Loth, Belgium, describes the technique used at Tsumeb in greater detail in this article.

Shaft sinking at the De Wet shaft started Nov. 1, 1949, and the first hundred feet was completed. As the surface area was in a shear zone, this section was lined with concrete. The permanent head gear and one hoist was then installed. Sinking was resumed in June 1950.

No difficulties were encountered until the shaft was about 2,000 ft. deep. At this depth a fissure in the west wall was intersected, which carried nearly 1,000 gpm. The shaft had been connected to the old workings at the 1890 level, and this water was bypassed into the mine and handled through the regular pumping system. This volume of water, however, stopped sinking temporarily.

Cementation Company of Africa was called in, and regular cement covers were drilled and injected at 50-ft. intervals. This stopped any increase in the volume of water and no serious delay occurred until the shaft reched the depth of 2,865 ft. below the collar.

When the cover holes were drilled at 2,865 ft., they all were found bottomed in an unconsolidated area containing water at high pressure (about 1200 psi. See sketch). Various intersections indicated a fault dipping 40 deg. south. This tied in with a major fault north of the mine, locally called the " North Break." The holes on the north side went through 15 ft. of solid dolomite and then 45 ft. of loose calcarious material. Drilling and injecting was continued for 65 days during which time 52 holes were drilled and redrilled. Total footage drilled was 8,046 ft. and the following quantities were injected: cement, 17,719 bags; calcium chloride, 5,300 lb.; sodium silicate, 2,500 Imperial gallons.

The sodium silicate acts as a lubricant and penetrates extremely fine openings in the rock. When calcium chloride is pumped into the hole, it reacts with the sodium silicate to form a white crystalline solid and thereby effect cementation. When this preliminary injection is followed up by cement grout, the sealing process is generally successful. However, if the hole fails to take cement grout, the hole is redrilled after the cement has its initial set, and the entire cycle is repeated.

When the test holes were dry, sinking was resumed. The shaft was stopped at the end of the cover which was 2,913 ft. below the collar.

As the walls in the fault area were weak, concrete lining was necessary. However, the east and west walls were air slacking at such a rate that immediate support was required. To give this support a series of 6-ft. and 8-ft. roof bolts were placed in the side walls on 3-ft. centers and on 6-ft. centers in the end walls. All bolts were equipped with ⅝-in. plates 12 in. square. A grid of 1-in. reinforcing rods hooked at both ends was hung on these roof bolts or on additional pins. The forms were then completed and three sets (6-ft. centers) were poured using 1:2:4 mix. The forms were then moved up and the last two sets were completed.

To inject the next lift it was necessary to place a 7-ft. concrete mat in the bottom. The 44 casing pipes for the next lift were positioned before the mat was poured. To key the mat to the lining, the top was brought about one foot above the bottom of the reinforced concrete.

Because of the high pressures applied to the grouting material, care

was required to seal in the casings effectively, lest they blow out and injure personnel. Thus the casings were cemented securely in place before grouting place proceeded. Steel knobs were welded onto the outer surface of the casing to establish a firm bond between the casing and the concrete cover.

After the mat had set, drilling and injecting was resumed. The holes in this lift all bottomed in solid rock. This cover was completed in 35 days and required 9,413 ft. of drilling and redrilling, 2,872 bags of cement, including 600 required for the mat, 25,200 lb. of calcium chloride, and 4,618 Imperial gal. of sodium silicate.

The shaft was then sunk well into solid at 2,991 ft., and 13 sets of reinforced concrete lining poured. Sinking then continued through normal covers to the present depth (3,250 ft.) without delay.

To drill the cover holes to depths of 70 ft., a regular 3½-in. sinker was used, and the 1¼ in. rods equipped with an independent water feed Where holes over 70 ft. were required, as in the second lift, through the fault, a 4-in. slide-valve rock drill, removed from wagon drill, was used. The larger machine drilled holes down to 130 ft. The 10-ft. extension rods were connected by a ridgeless coupling.

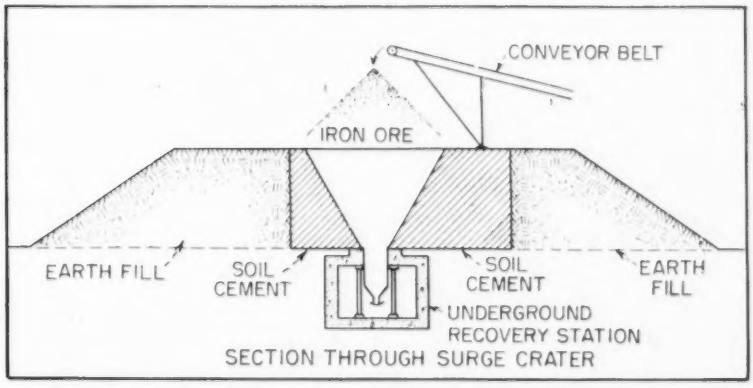
Cement and chemicals were injected by a pump, designed by the Cementation Co., which develops pressure up to 6,000 or 7,000 psi. At Tsumeb injection was stopped when the pressure reached 3,000 psi. The consolidating material was delivered from the pumps to the holes through high-pressure pipe fitted with special couplings developed by the same company.

RUBBER-TIRED wobble wheel soil compactor was specially constructed for the Marble Mine soil-cement job.

SHEEPSFOOT compactor wheels were attached to conventional tractor to aid placement of soil-cement base.

SOIL-CEMENT mixture is placed behind steel ore hopper by conveyor discharging from paving machine.

Soil Cement Used to Stabilize Ore Hopper Foundation



SOIL-CEMENT WAS PLACED in a restricted movement area around the ore hopper of the Marble mine operations to provide a solid, load-bearing foundation. A similar project is now under way at Oliver's Plummer mine.

OLIVER IRON Mining Division's unique use of soil-cement to stabilize an ore hopper proved so successful that the same construction is being employed at another Oliver plant this year.

In 1950, the company successfully had soil-cement placed in a "restricted movement area" at their mine in Marble, Minn., to provide a solid, load-bearing foundation for the metal hopper through which iron ore passes. This heretofore untried use of soil-cement was decided upon by the engineering department of U. S. Steel's Mining Division when previous earth fills with the same types of soil allowed the hopper to bulge under the pounding of large chunks of ore. Soil-cement was chosen as a substitute for the earth fill.

Approximately 5,000-cu. yd. of compacted soil-cement were placed in 6-in. lifts to a height of 34 ft. The lower 32 ft. of the fill had a 6% cement content and the top 2 ft. had 15%. The whole was sealed with a bituminous cap. Erection of the metal plates for the hopper at the same time the soil-cement was placed provided both speed and economy in construction.

Equipment used included a conveyor, bulldozer, specially constructed compactor (sheepsfoot tractor), pneumatic hand compactors, front end loader, specially constructed rubber-tired wobble wheel compactor, and Kochring 27-E paver. Steel plates for the hopper were erected in 4-ft. sections at 60 deg. horizontal. Approximately 30 cu. yd. of soil-cement mixture were placed per hour with the 27-E paver. The sheepsfoot tractor and rubber-tired wobble roller compactors were able to work very close to the hopper, but the mixture was hand-

tamped with the pneumatic tamper at the steel.

The soil used was a sandy waste material containing sufficient fines and about 9% moisture, supplied by the Oliver Division from their Gross-Marble Mine. Job supervisors for Oliver were Elmer G. Stone, superintendent of construction, and James R. Baumgartner, field superintendent. Sam Day was project manager, representing the S. J. Groves and Sons Co., and Grant Miller was job superintendent.

At Plummer Too

A similar project is now underway at Oliver's Plummer mine, also in Minnesota. Facing the same problem, the contractors have again called on soil-cement as a result of its successful performance at the Marble mine. The current construction at the Plummer project is being handled by Ulland Brothers of Duluth and Austin, Minn. They are using a pug mill mixer and spreading the material by truck and bulldozer in this new project which totals 8,000 cu. yd. of compacted soil-cement.

Kaiser Steel Corporation — Eagle Mountain Mine

12 Months—July 1, 1952 to June 30, 1953. Direct operating cost per net ton all material. Total material—3,322,000 tons; 21 days worked per month; 13,182 tons per day—single shift

	Labor: Direct P. R. Taxes and P. R. Ins.	Repairs	Supplies	Special Items	Total
				(Explosives)	
Drilling and Blasting	0.05	0.01	0.03	0.06	0.15
Shovel Operation	0.01	0.02	0.01	—	0.04
				(Tires)	
Truck Operation	0.02	0.02	0.01	0.02	0.07
Total	0.08	0.05	0.05	0.08	$0.26

Tons Ores 1,720,000
Tons Waste 1,602,000

Total Tons 3,322,000
Average length of truck haul 1800 ft.

Open Pit Mining Costs Reported For Kaiser Eagle Mountain Mine

AT A RECENT San Francisco meeting of the American Iron and Steel Institute, Kenneth B. Powell, superintendent of raw materials, Kaiser Steel Corp., Fontana, Calif., reported the accompanying cost figures for open-pit mining operations at the Eagle Mountain mine.

The figures represent direct operating costs covering the three major operations of the mine. In quoting these figures all overhead, property taxes, interest, depreciation, and depletion costs have been excluded, as these vary by locations and individual companies' accounting methods. Basic to all operations are direct cost for labor, maintenance repairs, and operating supplies. Only these have been included.

Mining Methods

Mining methods were outlined in part as follows by Mr. Powell:

Current mining operations on the North and South orebodies at the Eagle Mountain mine started in July 1952. These orebodies are being mined as one open pit. Twenty benches, each 30 ft. high, have been established. Ore is transported over a 70-ft. wide truck road built on a 7½% grade. Stripping ratio is about 1:1.

Blast holes are drilled with Bucyrus 29T and 42T churn drills, and drilling speeds are 7 ft. per hr., and 10 ft. per hr., respectively for these drills. Holes are cased with 6- to 10-ft. lengths of 10-in. pipe to prevent caving. Over-all drilling cost is $0.90 per ft.

Use Milli-second Delays

Holes are loaded with 40% nitro starch, slow-speed bag powder, 5,800 to 6,500 fps. Seventy-five percent stick powder is used as a primer which is detonated by millisecond delays. Powder factor for all materials blasted is 0.37 lb. per ton.

Four shovels, two Bucyrus-Erie electric with 4 and 5 cu. yd. dippers, and two Bucyrus-Erie diesels with 2½-cu. yd. dippers move on the average 13,182 tons per day working one shift per day. This figure is equivalent to 120 tons per hr. per cu. yd. of dipper capacity.

A fleet of 21 trucks, working on a single-shift basis, moves 13,182 tons per day. Eleven of the trucks are 15-cu. yd. Euclids, three are 15-cu. yd. Macks, and seven are 10-cu. yd. Euclids. All are of the two-axle end-dump type. On an average haul of 1,800 ft. with 18 trucks working, each truck averages 732 tons per shift. To maintain tonnage rate, pit floors and haul roads are maintained in a condition equal to pavement.

Braking Is Important

Ore and waste move either on the level or on a 7½% down-grade. Therefore engine power in the haulage units become secondary to braking capacity. All trucks are equipped with Parkersburg Rig and Reel Co., 15-in. Hydrotarders mounted on the drive shaft between the two universal joints. A separate water system, including a 115-gal. steam-off tank is mounted parallel to the truck frame. Power for the system's pressure is taken off the drive shaft, and the control mounted on the dash is connected by linkage to the three-way valve. Truck speeds can be held to a safe 9 to 15 mph on grades. The use of regular truck brakes is held to a minimum, and relines are required only after three to four years' service.

Experiments have been made with various types of liners to protect the truck bodies. The usual rails and angles have proved to be of short life, and continually in need of maintenance.

In May 1950, a new 10-cu. yd. body was purchased in which 1¼-in. cast-manganese plates were installed in sections. This body is still in service, and no repairs or maintenance have been required to date. The manganese work hardened quickly, and wear on the liner plates has been a minimum. The new 15-cu. yd. trucks acquired in 1951 were equipped with 1-in. cast-manganese liners. In May 1952, five trucks were lined with 1-in. abrasive resisting steel of plate made in the Kaiser mills. Manganese content was about 3%. Installations of this plate to date show practically no wear, and it is expected that this plate, called A-R, will prove to be most satisfactory and economical for the trucks.

An iron ore beneficiation plant is now under construction which will process the ore in a screening, magnetic separation, and heavy-density units. Beneficiated ore is expected to average 55.85% Fe; 0.084% P; 9.85% SiO; 1.29% AlO; 1.63% CaO; 3.92% MgO; and 0.354% S.

WASHINGTON IMPACT

Morton A. Reichek, McGraw-Hill Washington News Bureau

'Mining's Major Weakness' Underscored by Wormser

'Federal Government has neither statutory authority nor machinery to deal adequately with economic problems constantly arising in the mining industry.'

MINING'S MAJOR WEAKNESS was neatly pointed up in Assistant Interior Secretary Wormser's address at the recent International Mining Days conference in El Paso, when he said: "We have neither the statutory authority nor the machinery within the Federal Government to deal adequately with economic problems constantly arising in the mining industry."

It was this unhappy condition, presumably, that prompted President Eisenhower to create his inter-agency mineral policy committee to draft a national program for development and maintenance of U. S. mineral resources (see p. 184).

Deadline for the committee's final report is about March 1. There may be a preliminary report a month earlier to allow cabinet-level discussion of proposals worked up by the committee's various task forces, which consist of experts from several government agencies.

If the committee is successful, this will be the first time that a specific national mineral policy has been spelled out by the executive branch of government. Unfortunately, however, many Washington officials close to the mining scene are already writing the project off as nothing more than an amicable gesture to the industry.

Reasons for Pessimism

These are not professional skeptics. Rather, they are experienced observers who feel the committee's makeup reflects antagonistic interests that will be hard to resolve. They're worried that the committee might come up with another economic blueprint for the mining industry similar to last year's Paley Report, which has been subjected to considerable industry criticism.

Consensus seems to be wrapped up in the off-the-cuff comment of one skeptic, who says he will "be amazed if the committee develops major concrete programs that are new."

There are several factors responsible for this pessimism. Main one is the matter of relating the kind of new mineral policy that most domestic miners want with an administration foreign policy that most domestic miners already consider repugnant to their industry's interest.

The situation is best reflected by the mineral policy committee's composition. In effect, Wormser, who is generally considered the mining industry's unofficial spokesman in the administration, is the committee's chairman.

But observers here believe his personal views will not prevail in the committee's report, and that he is being forced to reconcile these views with the majority. The majority view, of course, is represented by the administration's avowed intention to stimulate, not bar, imports of foreign raw materials.

This majority is made up of officials of the State Department, which opposes tariff protection for domestic industries; the Commerce Department which represents the consumer viewpoint and will presumably oppose measures that would increase raw material prices; and the Office of Defense Mobilization, whose objective is to line up supplies of strategic materials, preferably at the lowest immediate cost, with little regard to whether production is from domestic or foreign mines.

Because of these factors, you can anticipate that the theme of the mineral policy committee's report will be little more than an innocuous declaration on (1) the strategic importance of the mining industry, (2) the need for maintaining free enterprise principles in mining, and (3) the fact that the government must perform certain functions for defense purposes that the private mining industry cannot afford—subsidization of high-cost nickel and titanium production, for example.

Industry Dissension

Mining industry's diverse views on relatively minor questions makes formulation of a meaningful mineral policy even more difficult. This is especially confusing to Congressmen from outside mining districts and to non-partisan government officials who would like to play the issue of aid to the industry right down the middle.

The industry's disunity was demonstrated again at last month's tariff commission hearings on the lead-zinc producers' request for hikes in import duties. While most witnesses plumped for tariffs on both ores and metal, one influential company recommended increased tariffs only on lead metal. Then, of course, there were companies testifying against all tariffs. There was even a greater lack of unanimity in testimony on proper break-even prices for domestic producers.

Mineral policy committee's most significant action will probably be a move to reestablish the National Minerals Advisory Council, a high-level industry group disbanded almost two years ago as an anti-trust risk. Its eventual rebirth could probably accomplish more for mining in the long run than a simple policy drafted by the president's inter-agency committee.

Meanwhile, working apart from the President's policy committee, Sen. George Malone's minerals subcommittee of the Senate interior committee this month completed its investigation of the mineral expansion and stockpile programs. Its report is due Jan. 30.

The report will document Senator Malone's claim that the Western Hemisphere is self-sufficient in all strategic metals and minerals (except for industrial diamonds), provided there are sufficient incentives for exploitation. A subcommittee staff expert says the report will refute the Paley Report's charge that the United States is a have-not nation in minerals.

Lead-Zinc Subsidies

The foregoing provides background for current talk in Washington about direct subsidies for lead and zinc producers, and maybe for producers of other metals later on. This is being seriously discussed by influential mining men here who have traditionally opposed subsidies, men who have denounced World War II's premium-quota plan as a discriminatory scheme that subjected the mining industry to government controls.

They now look upon a subsidy plan as the most expedient alternative to other forms of assistance. They resignedly believe that prospects for tariff aid to lead and zinc are just about nil. They consider import quotas ineffective and expect no additional

(Continued on page 102)

LABOR THIS MONTH

Joseph M. Gambatese, McGraw-Hill Washington News Bureau

MINE-MILL SHIFTS CONVENTION: For years, Mine, Mill and Smelter workers held their annual convention in September. Delegates usually celebrated new bargaining contracts signed in late summer. Hereafter, Mine-Mill will convene in March—before bargaining begins in nonferrous mines—with the next convention to be held in 1955. This shift in convention date was one of three constitutional amendments approved by Mine-Mill members in last month's referendum.

TWO MOTIVES BEHIND THE SHIFT: (1) To make the convention a sounding board for bargaining demands and (2) To combine the usual January wage policy meeting with the convention. The wage policy committee, beginning in 1955, will likely meet at convention time, thus saving expenses for local unions.

In other constitutional amendments the membership approved a Canadian Mine-Mill council and a Canadian vice president, giving Mine-Mill three vice presidents—Eastern, Western, and Canadian.

LEFT-WING MINE-MILL LEADERS KEEP CONTROL: In the bi-annual referendum, the Clark-Travis administration retained its hold on the union. President John Clark, Secretary-Treasurer Maurice E. Travis, Western vice president Orville Larson and most of the executive board were re-elected. Eastern vice president Charles Wilson "resigned" so that Asbury Howard of Bessemer, Alabama, could be elected in his place and thus give the Negro race "representation" in the union's hierarchy.

One anti-Travis member of the executive board was re-elected. He is William Mason of Butte, Mont., board member from district 1. Butte is the birthplace of the miners' union. Butte miners backed Mason for re-election and Charles McLean of Anaconda smeltermen's local for secretary-treasurer against Travis. They attacked Travis and other Communist influences in Mine-Mill and those who refuse to tell congressional committees whether they are Communists.

Anti-communists in Mine-Mill were encouraged by the good showing McLean made against Travis after attacking him as a Communist and asserting that he should resign for the good of the union. McLean's ripsnorting charges hurt Travis (who a few years ago said he resigned from the Communist party in order to sign a non-Communist affidavit, but still believed in Communism) because he could not reply to them.

WATCHING THE COMMUNISTS: Internal Security Subcommittee's task force on the Butler Bill held hearings at Pittsburgh last month, plans others in Chicago, Washington, D. C., New York and the South after the first of the year. Sen. McCarthy may enlarge his exposé of Communists in General Electric, take a look at those in mining, communications and farm equipment . . . catering to labor leaders, Eisenhower administration is leaning toward non-Communist affidavits for employees instead of the new approach offered by the Butler and Goldwater Bills . . . NLRB has appealed injunction obtained by fur workers preventing the board from disqualifying a union having an officer under indictment for signing a false non-Communist affidavit. This is the second injunction NLRB is fighting involving similar procedure invoked a year ago.

ANNUAL WAGE PROSPECTS DIM: CIO's steel workers won't put over the guaranteed annual wage next year, despite all the ballyhoo. Industry resistance is still too strong. Workers won't back a strike for the annual wage. The political climate isn't right. David McDonald can't bank on White House backing like the union got in 1946 (18½¢ first-round raise), 1949 (pension recommendation) and 1952 (seizure). Walter Reuther's CIO auto workers will join the fight in 1955 when their five-year contracts expire.

DMPA-type production loans or floor-price purchase contracts.

As one prominent Republican mining leader in Washington stated off the record to this reporter: "Eventually mining may be subsidized like farming. And if we're driven to it, what can we do?"

Another important mining man here—also a Republican—thinks he's got a subsidy plan for lead and zinc that would avoid the pitfalls of the premium-quota plan. Under the latter plan, mine operators had to apply for the subsidy and then be subjected to bureaucratic scrutiny of their costs, production, efficiency, output, and ore reserves.

The new proposal is patterned after the Treasury Department's domestic purchase program for silver. Exact mechanics haven't been worked out yet, but it would involve a protected price for lead and zinc at about 15c. lb. through government rebates to smelters, who would buy newly mined domestic ore at the open market price plus a sliding-scale subsidy.

Main advantage to the plan, according to its chief advocate, is that it would apply to all mine operators, and would keep their contact with government agencies to a minimum. He's now trying to round up legislative support for the scheme.

Nonfuel Minerals Panel Has Resources Hearings

STEERING COMMITTEE on problems of nonfuel miners for the Mid-Century Conference on Resources for the Future held public hearings at the Conference in Washington's Hotel Shoreham, Dec. 2-5.

Evan Just, vice president, Cyprus Mines Corp., and steering committee chairman, said that his committee encouraged public discussion as to whether the United States has reached a point where it is necessary to give special encouragement to American mining industries so as to obtain a level of production compatible with this nation's needs.

Just emphasized, however, that the aim of the Washington sessions was to block out areas of agreement and disagreement rather than to evolve a recommendation for legislation.

Other members of the committee were listed as John W. Vanderwilt, president, Colorado School of Mines; Christopher M. Granger, former assistant chief, U. S. Forest Service, Bethesda, Md.; Robert Koenig, president, Cerro de Pasco Corp., New York; Harold F. Mills, manager, Iron King Branch, Shattuck Denn Mining Corp., Humboldt, Ariz.; Donald Montgomery, United Auto Workers, Washington, D. C.; Willis M. Peirce, plant engineer, New Jersey Zinc Co., New York; Philip J. Shenon, geologist, Salt Lake City; Louis Ware, president, International Minerals and Chemical Corp., Chicago, and Howard I. Young, president, American Zinc, Lead and Smelting Co., St. Louis.

The second of two articles on profits

What Are PROFITS Used For?

This is the second article on the role of profits in our economy. The first was addressed to the question: "How High are Profits?" The answer was found to be: not high when compared with previous years and the present investment in corporate facilities. This second article is addressed to the equally important question: "What do corporations do with their profits?"

In 1953 corporations will earn about $20 billion *after taxes*, if the recent rate of earnings is maintained throughout the year. These profits will be used (1) to expand and improve productive capacity through purchases of new plant and equipment, (2) to finance the operations involved in a growing volume of business and (3) to reward the people who have invested their money in American industry. Of the $20 billion, the corporations will pay about $9 billion to their stockholders as dividends. They will use the $11 billion that remains to purchase new plant and equipment and to increase their working capital.

This year corporations are increasing their plant, equipment and working capital by a total of approximately $32 billion. Of this amount, about $26 billion is for new plant and equipment. The remainder is for working capital. As this article will show in greater detail, about $21 billion of this will come from depreciation allowances and sales of new securities. The other $11 billion will come from retained profits.

It is impossible to trace exactly how each dollar of retained profits is spent. This money is mixed with other money that goes into the company treasury in the form of proceeds from loans, sale of securities and depreciation allowances. *However, it is a fact that by retaining $11 billion of their profits this year, corporations have provided $11 billion toward their total capital requirements, including the money needed for expanded and improved capital equipment.*

Profits Mean New Plants

This year American industry is engaged in a very large expansion of plant facilities. This will increase the industrial capacity of the nation by about 7 per cent. Since 1950, our capacity has been increased by about 12.5 per cent. And all of this expansion has been privately financed, even though about one-third of it was certified as necessary for national defense.

The expenditure during 1953 of $26

billion for new plant and equipment—an alltime record—imposes terrific financial responsibilities on our corporations. About one-half of the amount required will come from depreciation allowances. In general, these allowances are supposed to pay for the replacement of worn-out or obsolete equipment. Another $8 billion will be raised by corporations through new security issues and long-term mortgage loans. All together, depreciation allowances, security issues and long-term loans will provide about $21 billion. But this is still $5 billion short of the $26 billion needed for new plant and equipment this year. Thus, it is retained profits that spell the difference between expansion and standing still, between growth in the productive capacity of the economy and running downhill.

As plant facilities are expanded, corporations also need more working capital. A larger volume of business requires larger inventories, larger accounts receivable and larger amounts of ready cash to meet payrolls and bills for materials. The increase in these items during 1953 is estimated at $8.5 billion, of which about $2.5 billion will be supplied by short-term bank loans. The other $6 billion will come from retained profits. Thus, retained profits provide an essential $11 billion—$6 billion for working capital, $5 billion for new plant and equipment—to meet corporate financial requirements.

Incentive for Investment

The role of the profits that are paid to stockholders as dividends or to employees under profit-sharing plans is even more important than the role played by retained profits in providing plant, equipment and working capital. Dividend payments provide the main incentive for investment in the stocks of corporations. They are the reward for risks taken by investors. Dividends paid by corporations whose common stocks are listed on the New York Stock Exchange provide an average return of about 6.5% at present prices, and dividends on preferred stocks average about 4.5% return. Dividends are distributed among 6.5 million stockholders. Also, it is estimated that 3 million employees now are covered by profit-sharing plans. These plans increase the incentives of both production workers and managers to work harder and more efficiently.

Thus, more than 9 million Americans have a *direct* financial stake in corporate profits through ownership of stock or participation in profit-sharing plans. But *all* Americans share indirectly in the rewards of a successful business year. Investment of a major part of 1953 profits in new plants and equipment means more employment opportunities and better working conditions for labor. For the nation, it means new industrial capacity that is essential both for national defense and to produce more and better goods for a rising standard of living.

Corporate profits after taxes represent about 6% of the nation's total income. But the job they do to stimulate investment and to finance industrial expansion and improvement is more far-reaching and more essential to the prosperity and well-being of the American people than would be suggested by that small figure.

McGraw-Hill Publishing Company, Inc.

DORR Developments in the field of concentrated fertilizers:

THE DORRCO STRONG PHOSPHORIC ACID PROCESS . . . the first process successfully developed for producing a strong acid. In operation, it has conclusively proven that it will economically and reliably produce 32 to 33% P_2O_5 phosphoric acid with a single stage of filtration.

THE DORRCO FINES RECIRCULATION SYSTEM . . . produces a 100% granular product of exceptional uniformity. This is the only system which can be used interchangeably to produce triple superphosphate, ammonium phosphates, ammonium sulfate or complete granular concentrated products.

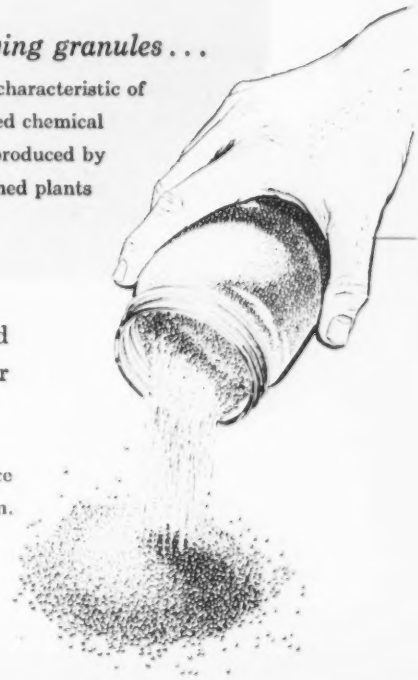
A CONTINUOUS METHOD of producing granular triple superphosphate with evaporation to only 38 to 39% P_2O_5, with no need for subsequent aging or curing of the product.

THE DORRCO SYSTEM of continuous vacuum evaporation which eliminates serious scaling, reduces P_2O_5 losses to a negligible point and involves no fume problem.

THE MANUFACTURE of ammonium sulfate from calcium sulfate obtained as a by-product of phosphoric acid production.

THE DORRCO FLUOSOLIDS SYSTEM... a new method for producing high strength SO_2 gas from pyrite and for the calcination of phosphate rock.

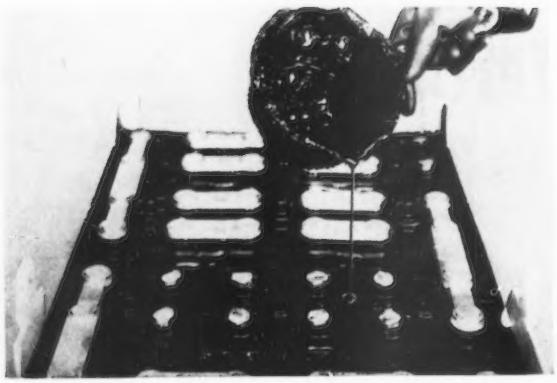
free-flowing granules . . .
important characteristic of concentrated chemical fertilizers produced by Dorr-designed plants



Dorr operates a complete consulting engineering service backed by 35 years of experience in the field of concentrated fertilizer production by the wet process.

Bulletin No. 8000 gives additional information about Dorr's experience and facilities in this field. Write to THE DORR COMPANY, Stamford, Conn.

OPERATING IDEAS



Eight Tips For Sealing Storage Battery Cells

USERS OF STORAGE batteries sometimes find it necessary to remove the cover from a cell for internal inspection and repairs. In reassembling the cell unit, it is essential that a proper seal be obtained between the cover and the jar. Gould-National Batteries, Inc. offers these eight tips to good results:

1. Use the right compound. Ask your battery manufacturer what compound to use. In most cases battery makers will supply sealing compound packaged, ready for use.

2. To melt the compound, almost any convenient source of heat may be used such as a gas burner, electric hot plate or blow torch. Do not raise the temperature of the compound higher than necessary to permit easy pouring of the melted compound.

3. Do not permit the compound to burst into flames because burning consumes the oil in the compound. Loss of oil impairs its effectiveness. Too rapid heating and too high temperatures cause the compound to catch on fire.

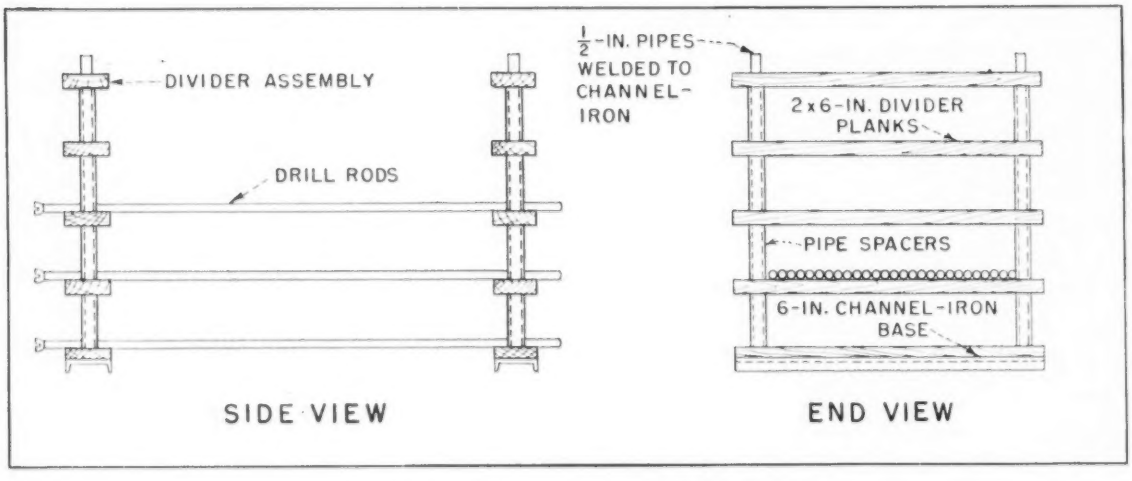
4. Almost any metal saucepan or aluminum coffee pot may be used to melt the compound. It is important, however, that the melting pot has a good pouring lip so that the melted compound can be directed into place accurately with a minimum of spilling.

5. Do not use too large a pot because more time will be required than to completely melt a smaller batch. A container holding about one quart is generally used. If some compound remains after pouring a seal, it may be cooled, stored and reused. However, when the compound is being reheated, do not puncture the unmelted top layer with a screwdriver or other pointed tool because pressure in the lower section of melted compound may cause hot, melted compound to squirt up through the hole. The hands, face or body of persons near by may be severely burned.

6. Clean the surfaces to be sealed, neutralize with ammonia or baking soda and dry all surfaces carefully.

7. Be sure the cover is properly seated on top of the cell and is level with other cell covers in the battery.

8. Pour the sealing compound into space between the cover and the jar being careful to avoid spilling. It is important to fill the space to the same level as the other cells in the battery so that there are no recesses where acid spray can collect. Use a sharp compound knife to smooth over rough spots and to remove excess compound after it has solidified.



Rack for Storing Drill Rods

THIS RACK WAS DESIGNED to simplify the storage and handling of drill steel in mine shops and warehouses. Main features of the unit are the adjustable removable dividers which afford quick accessibility of drill rods for removal or inventory, and the upright side rods made of short lengths of $1\frac{1}{2}$-in. pipe which are welded to the channel-iron bases to give stability to the stack.

JENKINS PRACTICAL PIPING LAYOUTS 70

How to plan an INDUSTRIAL WASTE TREATMENT SYSTEM

In many areas, stringent codes have been drawn up to regulate the types and condition of waste which may be discharged into streams and rivers, in order to conserve existing water supply sources.

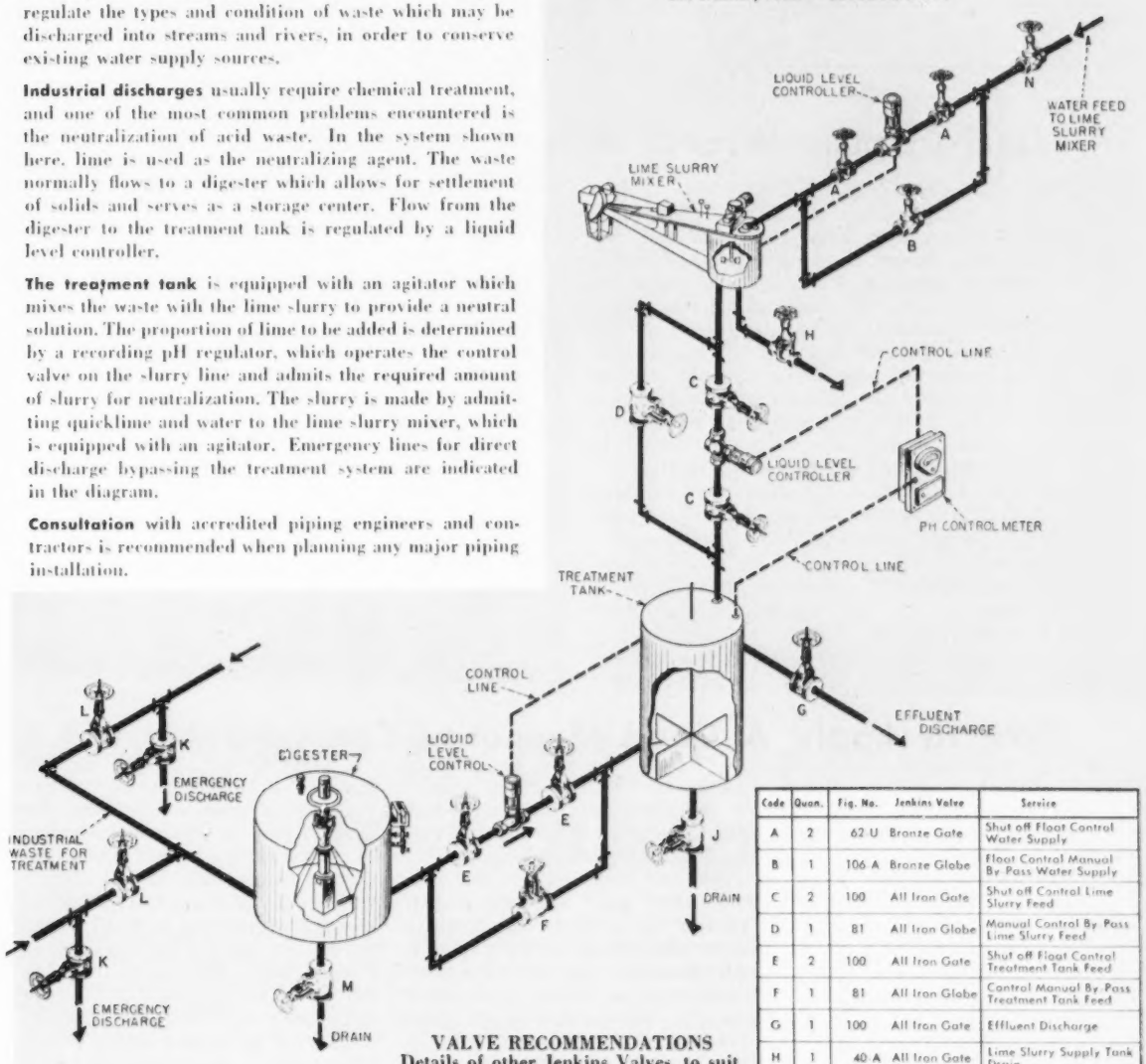
Industrial discharges usually require chemical treatment, and one of the most common problems encountered is the neutralization of acid waste. In the system shown here, lime is used as the neutralizing agent. The waste normally flows to a digester which allows for settlement of solids and serves as a storage center. Flow from the digester to the treatment tank is regulated by a liquid level controller.

The treatment tank is equipped with an agitator which mixes the waste with the lime slurry to provide a neutral solution. The proportion of lime to be added is determined by a recording pH regulator, which operates the control valve on the slurry line and admits the required amount of slurry for neutralization. The slurry is made by admitting quicklime and water to the lime slurry mixer, which is equipped with an agitator. Emergency lines for direct discharge bypassing the treatment system are indicated in the diagram.

Consultation with accredited piping engineers and contractors is recommended when planning any major piping installation.

Diagram by Huxley Madeheim, Consulting Engineer

COPYRIGHT, 1953 — JENKINS BROS.



VALVE RECOMMENDATIONS
Details of other Jenkins Valves, to suit varying conditions, available on request.

Code	Quan.	Fig. No.	Jenkins Valve	Service
A	2	62 U	Bronze Gate	Shut off Float Control Water Supply
B	1	106 A	Bronze Globe	Float Control Manual By Pass Water Supply
C	2	100	All Iron Gate	Shut off Control Lime Slurry Feed
D	1	81	All Iron Globe	Manual Control By Pass Lime Slurry Feed
E	2	100	All Iron Gate	Shut off Float Control Treatment Tank Feed
F	1	81	All Iron Globe	Control Manual By Pass Treatment Tank Feed
G	1	100	All Iron Gate	Effluent Discharge
H	1	40 A	All Iron Gate	Lime Slurry Supply Tank Drain
J	1	81	All Iron Gate	Treatment Tank Drain
K	4	100	All Iron Gate	Emergency Waste Discharge
L	4	100	All Iron Gate	Shut off Waste Lines
M	1	81	All Iron Globe	Digester Drain

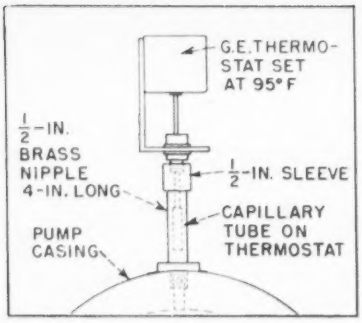
To simplify planning, to save time, to get all the advantages of Jenkins specialized valve engineering experience, select all the valves you need from the complete Jenkins line. It's your best assurance of *lowest cost in the long run.* Jenkins Bros., 100 Park Ave., New York 17.

Complete description and enlarged diagram of this layout free on request. Includes additional detailed information. Simply ask for Piping Layout No. 70.

SOLD THROUGH LEADING INDUSTRIAL DISTRIBUTORS EVERYWHERE

JENKINS VALVES
LOOK FOR THE DIAMOND MARK
SINCE 1864

Thermostats Safeguard Mine Pumps

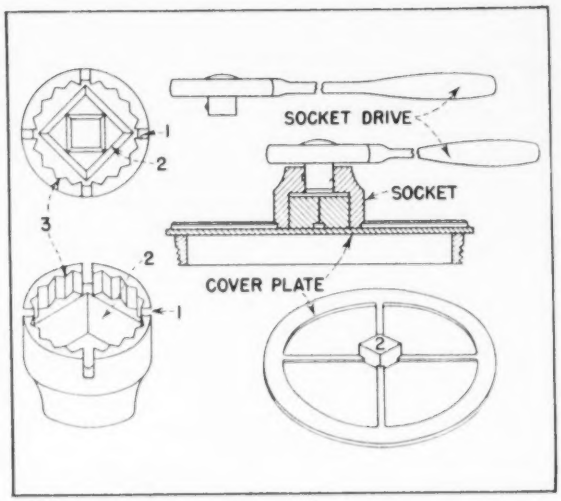


PHIL KEAST, master mechanic, Empire Star Mines Company, Ltd., Grass Valley, Calif., writes that installation of thermostats on mine pumps as shown has resulted in lower maintenance costs and fewer shutdowns. This thermostat will shut down any pump failing to "take its water." Heating of the pump case which results from such failures causes the thermostats to shut off the pump. The water handled underground is about 70 deg. F. and a 20-deg. rise will take the pump off the line. On the large 500 hp, 1,600 ft. head, centrifugal pumps, a tee with a petcock is used in place of the ½-in. sleeve to release air while priming the pump. All thermostats are installed on top of the pump casings.

Dual-Purpose Wrench Aids Electrical Maintenance

REMOVING INSPECTION PLATES from motors and electrical equipment is simplified by use of a dual-purpose socket wrench designed and made by Gus C. Stefanick, former mine mechanic and now a foreman at Grant Town, W. Va. The socket was made from a solid piece of iron machined to the proper size. First the four slots or notches (1) were cut equidistant apart around one end of the socket. Then the opposite end was made to hold a ¾-in drive. This tool served to remove covers and inspection plates from motors and electrical equipment. However, a second socket or wrench was needed to remove covers which had raised square centers. To eliminate this second tool, Mr. Stefanick removed the center from the socket and shaped it to fit the lids with the square center (2). This addition permitted removal of all types of lids on electrical equipment. As a final step, the socket was altered (3) so that it could be used for loosening or tightening various sizes of hexagonal bolts or nuts.

The socket has saved a great deal of repair time.



How to Apply A Good Magnetite Converter Lining

THIS PRACTICAL ADVICE is offered by Mr. Forrest E. Wing, of Tacoma, Wash., who has been a skimmer in Peru and the United States but is now retired.

It has been quite a few years since I have worked at copper converter furnaces, but the practice has changed very little in that time. The magnetite linings are still put on in the same old way. The job still requires four to six hours of smoky, hot work at the puncher's side, often resulting in crooked tuyere holes when the job is done. Sometimes it is discontinued before a proper lining is put on because of the desire to get through with an unpleasant job. An unnecessary amount of magnetite has been produced, much of which is never reduced but goes over to the reverberatory furnace (where it is not wanted) with the converter slag. All of this is unnecessary.

Let the skimmer make a small charge of clean copper, (heavy on the small), from clean white metal, no silica or very little left on the last skim. Don't run the copper too high, for obvious reasons, then pour in, say, a half ladle of matte. Blow this down to low-grade copper, open the tuyeres and repeat. Repeat the above until a satisfactory lining is produced and you will have a good lining, straight holes and the bulk of magnetite on the converter walls where it belongs, and comparatively little to go over to the reverb where it is not wanted.

This system is much easier on the punchers but requires constant attention of the skimmer, not as at present where the skimmer has a five-hour vacation on pay. This is one reason why skimmers resist the idea.

The charge need not run too hot. That is up to the skimmer. He can blow light, etc. It is actually easier on the converter and the hoods. It is easier on the converter because magnetite is soon deposited and on the hoods because of short blows. I have lined converters successfully in this way.

The one big thing to avoid is the making of too big a first charge on the new lining, for the obvious reason that a big charge runs too hot on finish because the blowing is too deep. It is better to transfer a part of the regall after lining before taking on matte and silica to slag and build a charge the regular way. However, this need not be necessary if the skimmer has been workng with a small charge all through the lining operation.

Of course the copper is not finished when the lining operation is completed any more than in present practice. The charging of matte and silica blowing and slagging is necessary to get good slags and a magnetite free body of white metal to finish to copper.

SLUGGING IT OUT TO LABRADOR IRON

Reliability and ruggedness are vital here. These two Caterpillar DW10 Tractors with No. 15 Scrapers are far out in the Canadian woods, at Mile 142 of the Iron Ore Co. of Canada's railroad from Quebec to the rich Ungava iron ore deposits in Labrador.

Below-zero temperatures, a 20-hour work day, and extremely difficult terrain make this one of the world's toughest tests of equipment. There are about 195 Caterpillar units, almost two-thirds of the total equipment, on this $200,000,000 job!

Because of an 8" frost overlay, the Cat* Scrapers must be shovel-loaded by the Caterpillar-powered P&H crane in the illustration. The mixed sand, silt, and equipment-busting boulders is hauled 1½ miles to fill another part of the right-of-way.

These Caterpillar DW10s can highball at speeds up to 24.5 m.p.h. for fast and low-cost production. The companion No. 15 Scraper hauls a heaped load of 12.5 cu. yd. With its sharp turning ability, stability in rough going, and excellent operator visibility both front and rear, the combination of Cat DW10 and No. 15 Scraper is a "natural" for mining work of many kinds. Like all Caterpillar Engines, the DW10's has fast, positive starting, and delivers full power on money-saving No. 2 furnace oil.

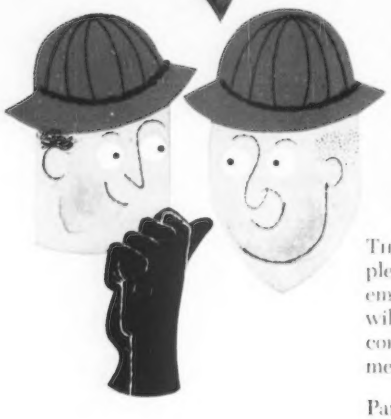
Call your Caterpillar Dealer for an on-the-job demonstration of this fast-hauling team. And count on him for prompt, skilled service and genuine Caterpillar parts.

Caterpillar Tractor Co., Peoria, Illinois.

CATERPILLAR*

*Both Cat and Caterpillar are registered trademarks—(R)

**NAME THE DATE...
YOUR DEALER
WILL DEMONSTRATE**



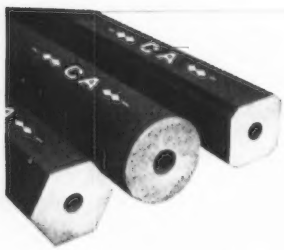
they're using

CRUCIBLE HOLLOW DRILL RODS at FOLSOM DAM

THE FOLSOM DAM project is a big construction job. When completed it will be 340 feet high, 1400 feet long – with wing embankments extending for more than two miles. The new dam will provide a source for irrigation and power, and serve to control flood conditions in the American River Basin near Sacramento, California.

Part of the construction work involves the excavation of more than 9 million cubic yards of earth and rock. Here's where Crucible Hollow Drill Rods are playing a mighty important role. They can't be beat when it comes to hard rock drilling operations.

Crucible Hollow Drill Rods are made to tool steel standards by the world's largest producer of tool and other special purpose steels. This *extra* quality assures you of minimum rod breakage . . . and fewer valuable bit losses. For dependability in rock drilling, buy Crucible Hollow Drill Rods.



CRUCIBLE first name in special purpose steels

53 years of *Fine* steelmaking

HOLLOW DRILL ROD

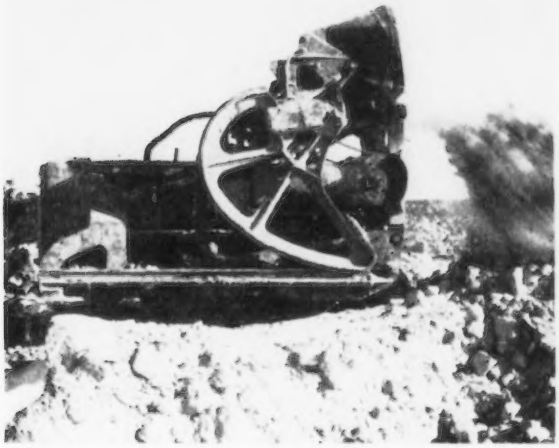
CRUCIBLE STEEL COMPANY OF AMERICA, GENERAL SALES OFFICES, OLIVER BUILDING, PITTSBURGH, PA.

REX HIGH SPEED • TOOL • REZISTAL STAINLESS • ALLOY • MACHINERY • SPECIAL PURPOSE STEELS

E & M J

NEW PRODUCTS DIGEST

For further information on these products, circle item numbers on card—insert and mail.



OLD

EIMCO'S 102 loader mucks an inclined shaft on the Colorado Plateau.

NEW

EIMCO'S 105 loader now available, has more important design changes.

New Rockershovel Reveals Many Improvements (1)

EIMCO CORP., which previously mounted its high-leverage rocker-arm overhead loaders on conventional tractors for heavy-duty surface loading, early in October announced development and production of a new clutch-less tractor or prime mover of radically new design which will be produced on a one-a-day basis after a $3-million retooling job at Eimco's Salt Lake City plant.

The new Eimco, designated Model 105, is a cab-in-front unit rather than locating the operator in the conventional seat aft as Models 102 and 104.

Other basic improvements cited are these:

(1) Whereas other track type equipment must stop one track and move the other track forward or in reverse to turn (thereby making for excessive wear on track pads), the Eimco 105 "spin turns" through a dual drive under which one track moves forward while the other reverses.

(2) Fingertip "push button" controls have replaced the foot clutch and shift levers, since the 105 uses a full mesh gear transmission actuated by hydraulic clutches which are an integral part of the transmission. The clutch and transmission mechanisms are sealed in an oil bath.

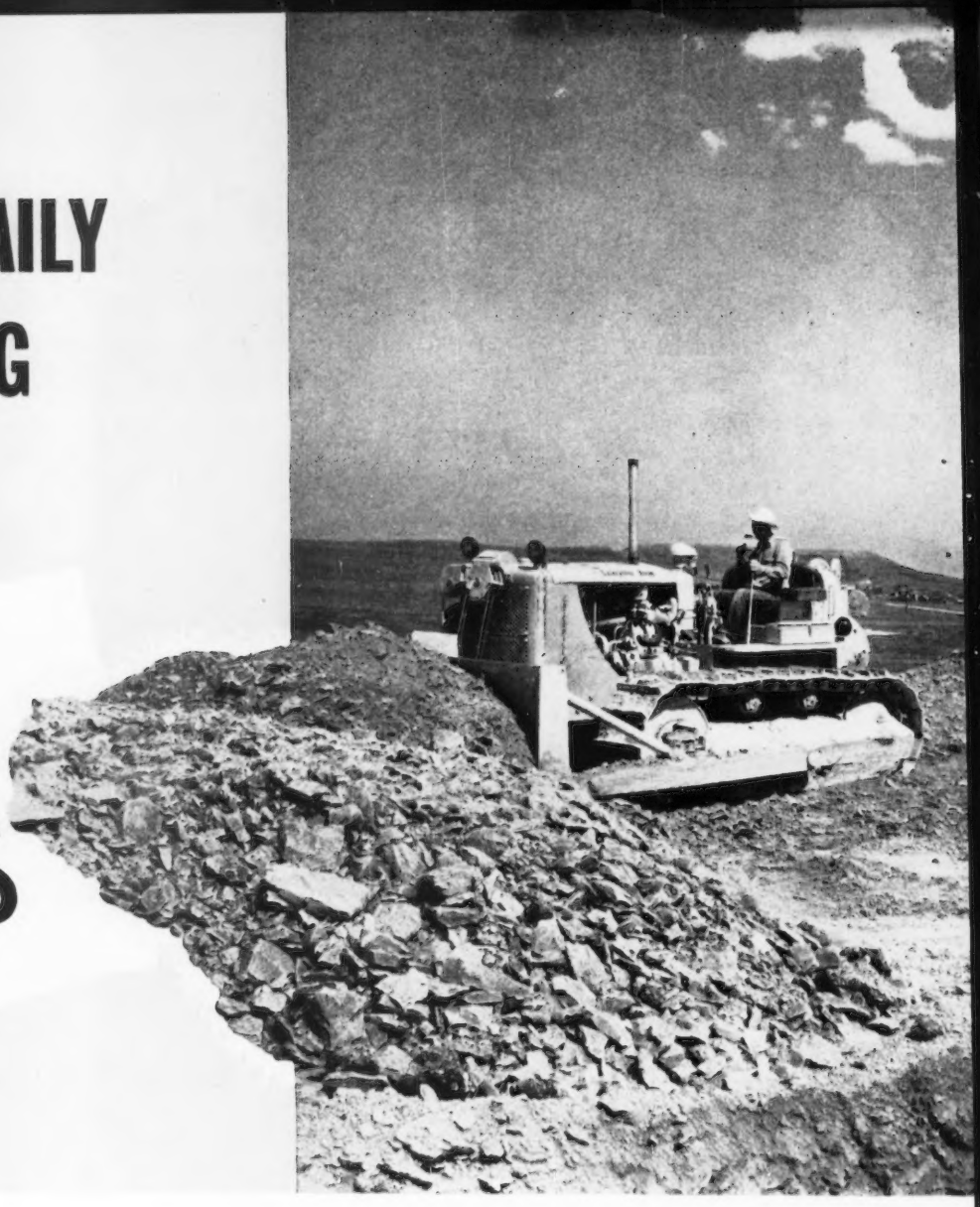
(3) The 105 can make full use of its tractor's oscillating motion when in use as a loader or prime mover. Where other tactors use rigid frame construction, the Eimco accommodates its tracks to the ground contour on slopes.

Meanwhile, taking much of the strain out of heavy-equipment operation, the cab-in-front seat provided for the cat-skinner is of sponge rubber, and thoughtful designers have even provided an electric cigar lighter.

Joseph Rosenblatt, president of the Salt Lake Manufacturing firm, reported Monday that a $3-million retooling program permitting output of the 34,000 lb. machines on a one-per-day basis is nearly completed. He termed demand for initial models "very gratifying."

Powered with General Motors diesels and utilizing Allison torque converters, the first 105's off the production line have undergone successful tests at the Geneva plant of U. S. Steel Corp. and the Fontana plant of Kaiser steel, where they were utilized in clearing slag pockets beneath steelmaking furnaces. Others have been used in a variety of rock and earth-moving chores as both loaders and prime movers.

ITS DAILY 'DOZING IS 1200 TONS



THAT's a big load on the blade of this Caterpillar D7 Tractor. The husky yellow unit handles 1200 tons of Bentonite clay every 10-hour day on the stockpile of American Colloid Co.'s reducing plant near Belle Fourche, South Dakota.

"We're very pleased with our D7 and 'dozer," says Edwin Busfield, plant superintendent. "It stands up very well and is economical to operate. We also receive very good parts and repair service."

Big, high-profit loads are a cinch for the D7 with matching bulldozer. Its Caterpillar-built Diesel Engine develops maximum torque when it's under load. The machine won't smother down, will deliver power *when* you want it. The 'dozer's scientifically curved moldboard means that loads are *rolled*, not pushed, so you can handle more material at higher speeds. The Cat* D7 Tractor is built to stay on the job for years to come, with a minimum of costly down time. Tractor and 'dozer stand up to equipment-busting rock, thanks to their extra-rugged construction and long-wearing high-strength steels.

Your Caterpillar Dealer sells a wide range of tractors and bulldozers. He will arrange a practical, on-the-job demonstration of the tough Caterpillar-built team that suits *your* job. And remember, you can rely on him for fast, skilled service and genuine factory parts.

Caterpillar Tractor Co., Peoria, Illinois.

CATERPILLAR*

*Both Cat and Caterpillar are registered trademarks - ®

NAME THE DATE... YOUR DEALER WILL DEMONSTRATE

For Your Files

This informative manufacturers' literature is free unless otherwise specified. To obtain bulletins circle their numbers on card below and mail.

CRANE TRUCK. An electric-powered, two-wheel drive crane truck is detailed in two-color folder issued by the Elwell-Parker Electric Co., Cleveland, Ohio. (31)

IRON ORE BENEFICIATION. Effective application of electric power to iron ore beneficiation projects is covered in a new 20-page booklet (B-5858) from the Westinghouse Electric Corp., Pittsburgh, Pa.

Each step in mining and processing the ore from pit operations through transportation, milling and concentrating, townsite planning and power generating and distribution is covered in this booklet. Types of electrical equipment and systems best suited for each phase are described. (32)

TRANSMISSION BELTING. Brochure (A5162K), illustrating and describing recently developed Thor rayon transmission belting has just been issued by Goodyear Tire & Rubber Co., Akron, Ohio. (33)

SHOVEL-CRANES. Thew Shovel Co., Lorain, Ohio, has just published a new book on the construction of their Lorain-TL series of shovels-cranes, entitled "The Inside Story on the Package Component Design of the Thew Lorain TL Series." It is a "Trans-Vision" presentation that enables one to see "inside" the machine. (34)

TESTING INSTRUMENTS. A buyer's guide on electric testing instruments (GEA-5469B) has been announced as available from the General Electric Co., Schenectady 5, N.Y. (35)

LOCKED COIL ROPES. This booklet deals with locked coil rope for hoisting, guide ropes, aerial track ropes, and for engineering purposes. British Ropes Ltd., Doncaster, Engl. (36)

RUBBER-INSULATED POWER CABLES. A 128-page book, OK-1075, entitled "Rubber-Insulated High Voltage Power Cables Up to 35,000 Volts," is the first technical publication dealing with rubber-insulated cables for use at such high voltages. Advantages, economies and versatility of this type cable are discussed. The book contains complete technical information, including current carrying capacity tables, aluminum conductor conversion factors, formulas for calculating the effect of shielding, dimensional data on bare conductors and single conductor cable constructions, installation recommendations, methods for determining conduit size, fill and area, and methods for determining bending radii and pulling tensions. Of particular interest are the 29 pages of detailed drawings and instructions for splicing and terminating high voltage rubber-insulated cables. Okonite Co., Passaic, N.J. (37)

SCRAPERS. Scrapers and their application to earthmoving and bulk material handling is the subject of an eight-page booklet "A Good Business Deal," published by Caterpillar Tractor Co., Peoria, Ill. (38)

CENTRIFUGAL PUMPS. Ingersoll-Rand, New York, N.Y., published an 18-page, 3-color bulletin on the Class "CNTA" multi-stage centrifugal pumps. It incorporates sectional drawings, installation views and a 2-page chart showing the unusual amount of interchangeability of parts throughout the CNTA line. (39)

PAYLOADER. Hough Model HR-4-wheel drive "Payloader" tractor-shovel is the subject of a new 16-page catalog (No. 255). Included are pictures and detailed specifications of all seven sizes. Frank G. Hough Co., Libertyville, Ill. (40)

VIBRATING SCREEN. A booklet (No. 122-J) describing Hewitt-Robins' new Style J Vibrex vibrating screen is ready for distribution. The screen is especially recommended for use in small quarries and roadside contractor's plants. Hewitt-Robins, Inc., Stamford, Conn. (41)

A "WIRETEX" RUBBER COVERED HYDRAULIC HOSE SELECTOR has been prepared by the Republic Rubber Division, Lee Rubber & Tire Corp., Youngstown, Ohio. (42)

CONTROL VALVES. Condensed catalog (No. 531) describes the Quick-As-Wink line of air and hydraulic control valves, valve couplings, etc. Lists sizes, actions, permissible pressures, temperatures. C. B. Hunt & Son, Inc., Salem, Ohio. (43)

SILICONE RUBBER PRODUCTS. A new 8-page bulletin (AD-147) describing many of the silicone rubber products made by The Garlock Packing Co., (Palmyra, New York) has just been issued. Products described include diaphragms, gasketing, sheet packing, oil seals, rings, insulation tape, rod and valve stem packings, and molded shapes for many industrial uses. (44)

ORE DRESSING AID. Denver Equipment Co. would like to help you by testing ores, designing your flowsheet, designing you mill, selecting proper equipment and providing field service. Bulletin G-5307 describes these services and illustrates new Denver equipment in stock for quick delivery. (45)

USE THIS CONVENIENT CARD

to obtain further information on products and bulletins mentioned in the New Products Digest. Circle item numbers, tear out and mail.

Not good after February 1, 1954, if mailed in the U.S. or Canada.

Engineering and Mining Journal—December, 1953
NOT GOOD AFTER FEBRUARY 1, 1954—if mailed in U. S. or Canada

Please send me the catalogs or further information about the items from New Products Digest whose numbers are circled.

1	8	15	22	29	36	43	50	57	64	71	78	85	92
2	9	16	23	30	37	44	51	58	65	72	79	86	93
3	10	17	24	31	38	45	52	59	66	73	80	87	94
4	11	18	25	32	39	46	53	60	67	74	81	88	95
5	12	19	26	33	40	47	54	61	68	75	82	89	96
6	13	20	27	34	41	48	55	62	69	76	83	90	97
7	14	21	28	35	42	49	56	63	70	77	84	91	98

My Name ..... Position .....

Company .....

Address .....

NEW PRODUCTS DIGEST

S-A PRODUCTS. Stephens-Adamson Mfg. Co., Aurora, Ill., announces the formation of the S-A Standard Products Division. These items are now available for immediate shipment from stock. Bulletin 653 is a complete listing of the units available from this department. (46)

ROLL CRUSHERS. All important features of the roll crushers made by Lippman Engineering Works, Milwaukee, Wisc., are illustrated and described in this 10-page bulletin No. 1120. (47)

FLUOSOLIDS. Why and how you should roast your zinc concentrates by the FluoSolids method is handled in a 4-page bulletin (7501) entitled, aptly enough, "FluoSolids Roasting of Zinc Concentrates." Dorr Co., Stamford, Conn. (48)

NEW V-BELT MANUAL. A 52-page technical manual covering all elements of V-belt drives, complete with tables, graphs and diagrams is being offered by the Boston Woven Hose & Rubber Co., Boston, Mass. (49)

MATERIALS HANDLING. A four-page brochure on long-range materials handling machines has been released by Sauerman Bros., Inc., Chicago, Ill. Line drawings provide a simple explanation of how the drag scraper, slackline cableway and tautline cableway operate. (50)

COTTRELL PRECIPITATOR. Operators contemplating installation of equipment for recovering dusts, fly ash, fumes, mists, fogs or other similar suspensions in stack or process gases wil find much valuable data in the new 40-page booklet recently issued by Western Precipitation Corp., Los Angeles, Calif. This booklet summarizes latest advancements in Cottrell precipitator equipment, outlines various types of electrode designs, shell constructions, electronic and mechanical rectifier systems, and also gives helpful information on combination mechanical-electrical recovery systems (CMP units) which have recently brought new savings to recovery applications. (51)

PLASTIC PIPE. A just-off-the-press 12-page catalog tells why Republic Steel Corp. entered the plastic pipe field, describes the two principal types of plastic pipe made, shows how to join plastic pipe, and lists various engineering and corrosion data. (52)

COMPRESSORS. A 6-page, 2-color booklet (Form E) describing Davey Super Chief 315-500-600 cfm models is announced by Davey Compressor Co., Kent, Ohio. (53)

MINING STEEL. From Bethlehem Steel Co., Bethlehem, Pa. comes a 20-page booklet discussing hollow and auger drill steels for blast-hole drilling; solid drill steel for drilling and for the manufacture of a variety of tools; broaching and channeller steels for quarrying dimensional stone; and stone-dressing steels for tools used in the finishing of stone for ornamental purposes. A special chapter is devoted to ultra-alloy steels, a thoroughly proved analysis of the chromium-molybdenum type. (54)

ELECTRIC MOTORS. The recently announced GE line of Tri-Clad "55" motors built in 1-30 hp. ratings to latest NEMA dimensions, are described in three new bulletins available from the General Electric Co., Schenectady 5, New York. The publications contain complete descriptions of new maintenance, performance, and protective features of the line, and each includes a double-spread cutaway drawing of the motors. A 16-page booklet, GEA-6013, covers dripproof models; enclosed motors are presented in GEA-6012, an 8-pager; and 14-page bulletin GEA-6027 describes the new gear motors. (55)

PIPE CLAMP. Folder No. 101 explains application of the dual purpose lamp for the coupling or repair of gas, water and petroleum pipe lines. Complete price and specification data are included, and the 6-step method of assembly illustrates simplicity of design, speed of installation, and durability of the components of manufacture. Morris Coupling and Clamp Co., Ellwood City, Pa. (56)

VARIABLE SPEED MOTORS. Bulletin No. 1797 outlines reasons why variable speed motors can be used to improve production. It includes illustrations of all types of Varidrive motors showing mechanical features, remote controls, etc. U. S. Electrical Motors Inc., Los Angeles, Calif. (57)

CUSTOM BUILT EQUIPMENT. Facilities for the custom fabrication of process industry equipment in standard and special alloys are outlined in bulletin 10, released by Quaid Fabrications, Inc., Philadelphia, Pa. (58)

SELECT PROPER WIRE ROPE FOR JOB. "What's the Difference in Wire Rope?" explains differences in the selection of wire going into various rope, and differences in manufacturing processes. It also itemizes differences in results. Leschen Wire Rope Division, H. K. Porter Co., Inc., St. Louis, Mo. (59)

FLEXIBLE COUPLINGS. Link-Belt Co. has announced a new line of geared flexible couplings for high speed and high torque applications. Ten standard sizes are available, with bores ranging from one inch to six inches and with horsepower rating at 100 rpm ranging from 2 to 450. Hubs bored for either slip or shrink fit on shaft can be furnished. Folder No. 2375 gives detailed description, dimensional tables and selection data. (60)

PNEUMATIC WEIGHING SCALE. Catalog 10 describes new platform weighing scale adaptable for batch or continuous process control. The scale indication errors are never greater than 0.25% of range. Repro-

FIRST CLASS
PERMIT NO. 64
(Sec. 34.9, P.L.&R.)
NEW YORK, N. Y.

BUSINESS REPLY CARD
No Postage Stamp Necessary if Mailed in The United States

Postage Will Be Paid By—

McGRAW-HILL PUBLISHING CO., INC.
ENGINEERING & MINING JOURNAL
330 WEST 42nd STREET
NEW YORK 36, N. Y.

USE THIS CONVENIENT CARD

to obtain further information on products and bulletins mentioned in the New Products Digest. Circle item numbers, on reverse side, tear out and mail.

ducibility is better than 1 part in 3,000. Weighing Components, Inc., Hatboro, Pa. (61)

KILN END. The Allis-Chalmers Mfg. Co. air-cooled kiln end, designed and built to keep the discharge end of kilns cool, round and rigid, is described in a new bulletin (07B8040) released by the company. Diagrams in the bulletin demonstrate how the air-cooled kiln end eliminates overheating and consequent warping and distortion at the kiln's discharge end. (62)

PORTABLE HOISTS. A condensed full-line catalog is available from the Coffing Hoist Co., Danville, Ill. It contains illustrations, descriptions and specifications for over 100 different types and sizes of portable hoists. (63)

STORAGE BATTERIES. Users of storage batteries for cycle service in industrial trucks, mine locomotives and shuttle cars and material handling equipment will want the sixth edition of the storage battery "Red Book" which has been announced by Gould-National Batteries, Inc., Trenton, N. J. The 60-page booklet contains several new tables and illustrations of new battery tools and auxiliary equipment. It begins with a brief treatise on the theory of the lead-acid battery. Four subsequent sections give detailed instructions on the care and operation of batteries, maintenance repairs, standard and special parts and technical tables. (64)

ELECTRON MICROSCOPE. A 4-page folder titled "Some Reasons Why the World's Most Powerful Electron Microscope Deserves Your Consideration" is available from the Research & Control Instruments Division, North American Philips Co., Mount Vernon, N. Y. Forty-four typical applications are listed together with design and operating information concerning the viewing screen, accelerating potential, magnification, electron diffraction, focus determination and control, image stability, resolutions. (65)

LOADER. Advantages of using a 3-to-1 planetary type gear reduction in each wheel of the 4-Wheel-Drive "Shoveloader" are explained in a eight page brochure prepared by Baker-Lull Corp., Minneapolis, Minn. Literature also gives complete specification data on this new 1½ cu. yd. unit. (66)

CEMENTED CARBIDES IN WEAR-PROOFING PULVERIZING EQUIPMENT. Later information on the use of cemented carbides in wear-proofing pulverizing equipment is available in pulverizing bulletin WR-107, issued by Carboloy Department of General Electric Co., Detroit. Information includes applications from processing alfalfa to pulverizing powdered metal, as well as photomicrographs of cemented carbides and a table of standard and special tip shapes for pulverizing blades and hammers. (67)

PACKAGED-DRIVE. Packaged adjustable-voltage drives for variable speed applications are covered in a 16-page booklet (B-5808) available from the Westinghouse Electric Corp., Pittsburgh, Pa. The first of its kind, this booklet gives complete information about this adjustable voltage drive: construction and operation, typical applications, and the economics of operation are discussed. (68)

DIAMOND DRILL BIT. An attractive, well illustrated, 16-page book, file size and tab indexed for the users convenience, has just been published by Anton Smith & Co., Inc., New York.

Complete in every detail and containing information on the latest developments in diamond drill bit products, this catalog should be in every mining man's file. (69)

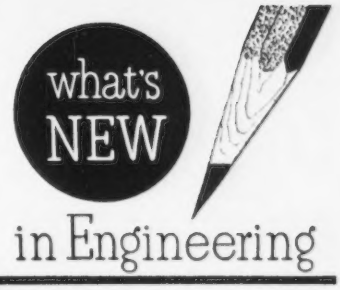
"PACIFIC-WESTERN TORQ-MASTER TRANSMISSION," explains in detail, with drawings and application photographs how the Torq-Master unit is designed for application to torque-converters and how it can be adapted to leading makes of converters. Bulletin No. 5328 is available from Western Gear Works, Seattle, Wash. (70)

CRUSHERS. This booklet, telling how to make the most efficient and satisfactory application of various types of crushers to specific jobs, has been published by Pennsylvania Crusher Co., Philadelphia, Pa. All the important factors such as power consumption, parts wear, maintenance costs, uniformity of product and others are discussed in detail. Also, a check list is given that goes a long way to help determine the best type of crusher for various jobs. Five types of hammermills, jaws, impactors, granulators, gyracones, Bradmills, Bradford Breakers, Bradford Hammermills and several types of single rolls are discussed in detail. (71)

pH METERS. A 4-page folder on portable pH meters, designed to simplify the choice of pH equipment, has been released by Beckman Instruments, Inc., South Pasadena, Calif. (72)

IMPROVISED TOOL BIT FORGE. This 8-page pamphlet diagrams step by step instructions for building an efficient, field tool-bit forge from an ordinary 55 gal. steel oil drum or other suitable container. Spang & Co., Butler, Pa. (73)

FLOW METERS. "An Introduction of Flowrator Meters" (10-A-10), 16-pages, discussed Flowrator meters and presents objective comparisons between these popular variable-area types and the more common variable-head meters. Fischer & Porter Co., Hatboro, Pa. (74)



Laboratory facilities for engineering research are available to individuals and groups with worthwhile projects at Richmond Engineering Field Station, administered by Department of Engineering, University of California. Charges are based on actual expenditures with appropriate overhead. For information, write Institute of Engineering Research, University of California, Berkeley.

Rebuilding a near-ghost mine at Sunnyside, Utah, for greater coking-coal production with higher efficiency, is a current major project of Kaiser Engineers. The original Sunnyside mines, opened in 1896, were in bad condition. The problem was to rehabilitate and expand two existing

mines and open a third to raise coking-coal production from 1,000,000 to 1,715,000 tons per year. We'll send you a reprint of an article by Wesley Hyatt and R. G. Heers in *Coal Age* which tells the full story of Sunnyside's emergence from a "near-ghost" to one of the most efficient and modern coal producers in the West.

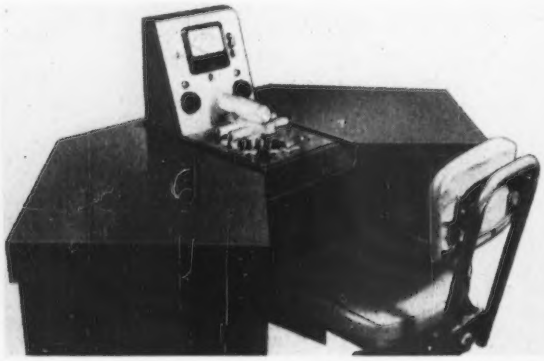
A $50,000 bonus goes to the first person to bring in a Tennessee oil well that will produce 50 barrels a day for six months, according to a new state law. Only 35 wells are now producing in Tennessee, but geologists think the State has rich oil possibilities.

When it comes to research, preliminary engineering studies, engineering design and layout, estimating, preparation of specifications, construction programing, negotiation of contracts, and procurement and expediting of materials and equipment — call or write: Kaiser Engineers Division of Henry J. Kaiser Company, Kaiser Building, Oakland 12, California.

(Advertisement)

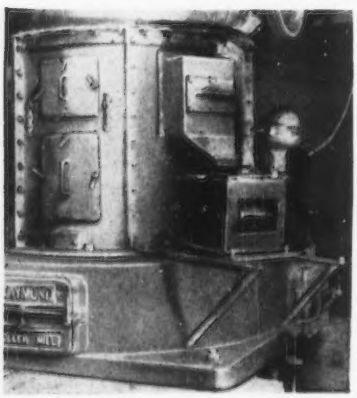
SIDE DUMP tractor and double trailer, and truck and trailer combinations are available in several capacities in lift-door, drop-door, and pan-type designs. Advantages of combination principle include separate maintenance for fewer spares and trip loads more than 75 tons. Easton Car & Construction Co. (2)

VIBRATION DETECTOR measures vibration acceleration up to 50 Gs in large rotating apparatus. General Electric Co., Schenectady, N.Y. (3)



FLUORIMETER uses fluorescent method for uranium analysis because of its sensitivity, speed, accuracy, and simplicity. Two operators can make up to 100 determinations per day even on samples containing less than .01% uranium. Jarrell Ash Co., Newtonville, Mass. (4)

GAS TURBINE ENGINE, weighing less than 100 lb., delivers 50 hp., operates at 40,000 rpm and can run on a variety of fuels from diesel oil to high octane gasoline. The engine is manufactured by Solar Aircraft Co., San Diego, Calif. (5)



PERMANENT MAGNET SEPARATOR is designed to remove iron contaminants from finely ground material. Requires no supervision or cleaning. F. W. Shrader Co. (6)

LABORATORY JAW CRUSHER, 3¼ x 4½ in., powered by 2-hp. motor runs at 350 to 425 rpm. Capacity is 500 lb. per hour of ¼-in. material. Denver Equipment Co., Denver. (7)

DUST HOOD protects eyes, head and neck from nuisance or irritating dust. Easy to wear, it weighs only 5 oz. Cost $2.75. General Scientific Equipment Co., Philadelphia, Pa. (8)

introducing the VC for core drilling

(illustrated below)

the VB for blasthole drilling

with the most powerful vane motor ever developed for diamond drilling

For customers who prefer a vane motor, these new lightweight underground drills have been developed as an alternative to our popular piston-type model JV.

Both VC and VB are equipped with our exclusive 4 feed 1-JEG swivelhead. Each is conservatively rated at 800 ft. drilling capacity with "E" rods.

VC — standard clutch, left-hand feed screw, two-speed transmission.

VB — right-hand feed screw, special blasthole rod adapter couplings, built-in waterswivel, 2 speeds fwd., 1 reverse.

DRILLS • BITS • EQUIPMENT • CONTRACTING

The World's Most Complete Diamond Drilling Service

WE LOOK INTO THE EARTH

BOYLES BROS

DRILLING COMPANY LTD.

VANCOUVER, CANADA

 (*Continued from page 69*)

Net Imports of Copper Rose in September

Net imports of copper by the U.S. in September totaled 48,543 tons, against 37,128 tons in August, according to a summary of recent official figures by the American Bureau of Metal Statistics. Figures for September and the nine months ended September, in tons, follow:

	Jan.-Sept.	Sept.
Imports		
In ore, etc.	91,515	15,282
Blister	222,895	33,955
Refined copper	239,383	9,415
Totals	553,793	58,652
Exports		
In ore, etc.	406	126
Refined copper	69,033	9,983
Totals	69,439	10,109
Net Imports	484,354	48,543

Copper imports, by countries in tons, follow:

In ore, etc.	Jan.-Sept.	Sept.
Canada	25,908	5,005
Mexico	10,385	885
Cuba	13,360	2,737
Bolivia	2,718	763
Chile	12,644	2,065
Peru	7,073	1,180
Cyprus	1,807	.....
Philippines	11,050	2,510
Union of South Africa	5,347	.....
Australia	737	122
Other Countries	486	16
Totals	91,515	15,282
Blister copper (content):		
Canada	3,494	.....
Mexico	31,983	5,258
Chile	103,722	9,376
Sweden	550	.....
United Kingdom	326	.....
Mozambique	5,853	3,613
Northern Rhodesia	58,029	12,803
Union of South Africa	166	.....
Turkey	10,184	651
Australia	8,588	2,254
Total	222,895	33,955
Refined:		
Canada	60,059	3,128
Mexico	7,512	.....
Chile	133,639	2,348
Peru	10,407	2,750
Belgium	4,255	200
Germany (West)	3,571	.....
Norway	2,449	650
Sweden	1,602	.....
United Kingdom	1,395	61
Yugoslavia	6,121	278
Belgian Congo	4,749	.....
Northern Rhodesia	244	.....
Union of South Africa	667	.....
Australia	2,543	.....
Other Countries	190	.....
Total	239,383	9,415

Copper Deliveries

Shipments of products (copper content) by U.S. fabricators during 1952 and the Jan.-Oct. period of 1953, by months, in tons:

	1952	1953
January	131,988	134,203
February	115,150	123,850
March	116,887	122,908
April	106,109	116,319
May	109,890	126,972
June	107,709	132,615
July	82,419	91,826
August	120,084	113,250
September	123,740	111,805
October	127,120	116,259
November	130,027	.....
December	119,263	.....
Total	1,391,477	.....

Miscellaneous Metals, Ores, Minerals

Quotations cover wholesale lots, prompt shipments f.o.b. New York unless otherwise stated

MISCELLANEOUS METALS

Nov. 30, 1953

Aluminum ingot, 99 plus percent, lb.	21½¢.
Antimony, spot, lb., 5 tons and up but less than carload, packed in cases.	31.97¢.
Bismuth, ton lots, lb	$2.25
Cadmium, commercial sticks, delivered, lb.	$2.00
Calcium, lb., ton lots, 98 percent, cast	$2.05
Chromium, 97 percent grade, lb., contract	$1.18
Cobalt, 97 to 99 percent, per lb.	$2.60
Germanium, lb.	$295.00
Indium, troy oz.	$2.25
Lithium, lb., 98 percent	$11.00 @ $14.00
Nickel, cathodes, lb., f.o.b. Port Colborne (a)	60¢.
Magnesium, 99.8 percent, carloads, lb., producer's plant, Freeport, Texas	27¢.
Palladium, troy oz.	$22.00 @ $24.00
Platinum (Official quotation wholesale lots) troy oz.	$91.00 @ $93.00
Quicksilver, flask of 76 lbs., 25 flasks or more	$185 @ $187
Selenium, 99 plus percent, lb.	$4.25 @ $4.75
Silicon, minimum 97 percent, carloads, lb.	18½¢.
Tellurium, lb.	$1.75
Thallium, 100 lb. or more, lb.	$12.50
Titanium, 99.3 plus, lb.	$5.00

(a) Includes U. S. duty.

METALLIC ORES

Beryllium Ore, imported, 10% BeO, per unit	$46.00
Chrome Ore, per long ton, f.o.b. cars Atl. ports, dry	
44% Cr_2O_3 no ratio	$27.00 @ $32.00
48% Cr_2O_3 3 to 1 ratio	$44.00 @ $55.00
Iron Ore, Lake Superior, Lower Lake ports, long ton:	
Old Range bessemer (b)	$10.30
Mesabi bessemer (b)	$10.05
Mesabi, non-bessemer (b)	$9.90
Lead (Galena), 80 percent, Joplin, Mo., ton	$166.50
Manganese Ore—Per long ton unit of Mn basis 48 percent manganese, nearby positions, subject to premiums and penalties $1.08 @ $1.10 c.i.f. U. S. ports, duty extra. Long-term contract nominal at 90c. to 93c., c.i.f. duty extra.	
Molybdenum Ore, 90%, per lb. of MoS_2 f.o.b. mines	60¢
Tantalite, 60% concentrate, per lb.	$2.50 @ $3.00
Tungsten Ore, per unit of WO_3	
Foreign, 60 percent, c.i.f. U. S. ports, duty extra	$28.00
Domestic, scheelite, 60 percent f.o.b. mill	$63.00
Vanadium Ore, per lb. of contained V_2O_5 f.o.b. mines	31¢.
Zinc Ore, Prime, 60 percent concentrate, Joplin, Mo., per ton	$56.00

(a) F.o.b. port of shipment. (b) Effective July 1, 1953.

METALLIC COMPOUNDS

Arsenous Oxide (arsenic trioxide) lb., in bbl. carload lots delivered	5½¢.
Cobalt Oxide, 72½% to 73½%, ceramic grade, per lb.	$1.96 @ $1.97½
Copper Sulphate, 100 lb.	$10.35
Germanium Oxide, lb.	$142.00

ALLOYS

Ferrochrome, 65 to 69 percent, per lb. of Cr contained	24¾¢.
Ferromanganese, 74–76%, net ton, seaboard	$200
Ferromolybdenum, 55 to 65 percent Mo. lb. of Mo. contained	$1.32
Ferrosilicon, 50 percent per lb. of contained Si	12.4¢.
Ferrotungsten, 75 to 80 percent, lb. of W contained	$4.10
Ferrovanadium, per lb. of V delivered	$3.00 @ $3.25
Silicomanganese, Max. 1½ percent carbon, per lb. contracts	11.4¢.
Spiegeleisen, per long ton, 19 @ 21% grade	$86.00

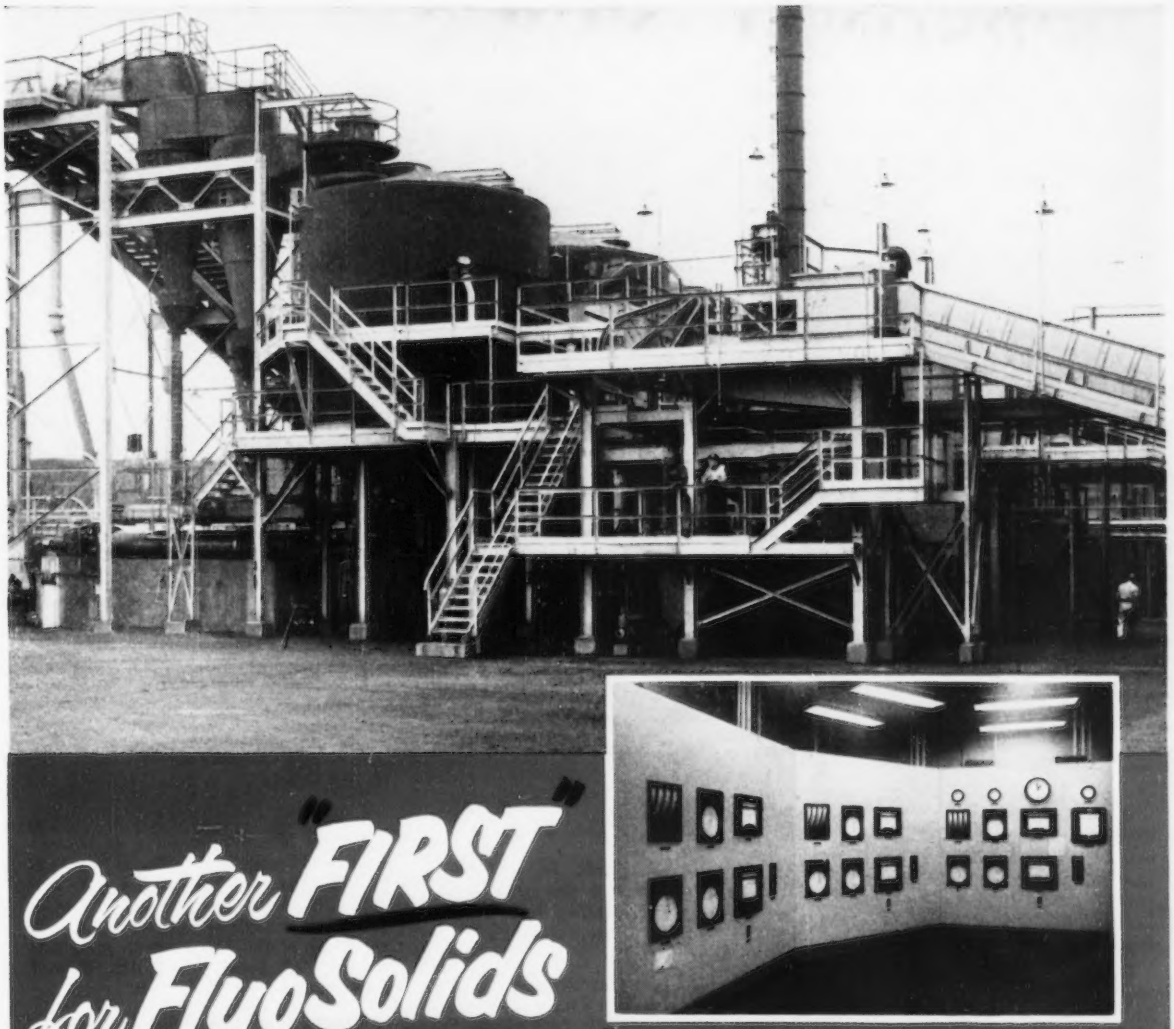
NON-METALLIC MINERALS

Asbestos, f.o.b. Canada (Quebec) mines (U.S. funds) ton:	
Crude No. 1	$960 @ $1,500
Crude No. 2	$595 @ $900
Spinning fibers	$321 @ $514
Shingle fibers	$150 @ $200
Paper stock	$109 @ $137
Waste	$77
Shorts	$35 @ $70
Asbestos, Vermont, f.o.b. Hyde Park:	
Spinning fibers	$279.50 @ $302.00
Shingle stock	$135.00 @ $162.00
Paper stock	$81.50 @ $115.00
Waste, stucco or plaster	$71.40
Refuse or Shorts	$44.00 @ $63.00
Barytes, f.o.b. cars:	
Georgia crude, per ton	$14.00
Missouri, 94 percent $BaSO_5$, per short ton	$13.25
Bauxite, long ton, f.o.b. point of shipment:	
Domestic, crude, 50 to 52 percent (not dried)	(a) $5.00 @ $5.50
Domestic, chemical, 55 to 58 percent	(a) $8.50 @ $9.05
Domestic, abrasive, 80 to 84 percent	(a)$18.00 @ $18.50
China Clay, f.o.b. mines, ton:	
Georgia, filler and ceramic grades	$8.50 @ $9.50
North Carolina ceramic grade	$20.25 @ $22.25
Feldspar, bulk ton:	
Potash or soda feldspar, 200 mesh, ceramic grade	$18.50 @ $22.25
Glass feldspar, white, 20 mesh	$11.75 @ $12.50
Fluorspar, f.o.b. mines, bulk, 70% effective ton	$42.50
60% effective CaF2	$38.00
Acid 97% concentrate, bulk, ton	$57.50
Fuller's earth, f.o.b. Georgia or Florida, ton	$7.00 @ $14.00
Magnesite, per ton dead burned, bulk, f.o.b. Washington	$38.00
Mica—Domestic, f.o.b. mines. Punch 12 to 22¢ per lb. according to size and quality. Sheet clear, 1½ x 2 inch, 70¢. to 85¢.; 2 x 2 inch, $1.10 to $1.60; 2 x 3 inch, $1.50 @ $1.60; 3 x 3 inch, $1.80 @ $1.90; 3 x 4 inch, $2.20; 3 x 5 inch, $2.40; 4 x 6 inch, $3.15; 6 x 8 inch, $4.25. Wet, ground, very fine, $140 @ $155 per ton. Bulk sales, dry ground: $32.50 @ $70.00 per ton Scrap $32 and up.	
Ocher, Georgia, ton, in sacks	$30.00
Pyrites, Spanish, per long ton unit of S, c.i.f. Atlantic ports	Not quoted
Sulphur, Texas, mines, long ton	$25.50 @ $27.50
Talc, f.o.b. works, ton:	
New York, purified	$18.50 @ $20.00
Vermont, extra white	$12.50
Tripoli, Missouri, ton:	
40 mesh, cream colored	$30.00

(a) Nominal.

IRON AND STEEL

Pig Iron, gross ton, basic, Valley Furnaces	$56.00
Steel f.o.b. Pittsburgh, billets, net ton	$62.00
Structural shapes, 100 lb.	$4.10 @ $4.15



Another "FIRST" for FluoSolids

New Installation Roasts Pyrite to Produce SO_2 for Acid Manufacture *and* a Desulfurized Calcine for Iron Manufacture

The first commercial Dorrco FluoSolids System for producing both SO_2 gas and a calcine for iron manufacture went on stream this summer at a large steel plant on the East Coast. Consisting of three 18′ dia. Reactors and auxiliary equipment, this is also the first installation in the United States to go into operation with multiple units. A simple, flexible system provides for pyrite storage, pulping and holding tanks, and slurry feeding into the Reactors.

Feed contains 43 to 48% sulfur and is self-roasted at an operating temperature of 1650°F. A 13% SO_2 gas is produced which, after passing through cyclones, is scrubbed and sent to a 250 TPD contact acid plant supplying acid for the steel plant. Calcine is cooled and, together with flue dust and fine ore, is sintered and charged to the blast furnace.

This installation is the latest in a long list of new applications for fluid technique. Other "firsts" for FluoSolids include arsenopyrite gold roasting, zinc concentrate roasting, providing a sulfating roast for copper-zinc concentrates, roasting sulfides for making cooking liquor in sulfite paper mills, and limestone calcination.

If you would like more information on FluoSolids — the most significant advance in roasting technique in the last 30 years — write The Dorr Company, Stamford, Conn., or in Canada, The Dorr Company, 26 St. Clair Avenue East, Toronto 5.

*FluoSolids is a trademark of The Dorr Company, Reg. U. S. Pat. Off.

DORRCO

Better tools TODAY to meet tomorrow's demand

DORR

WORLD-WIDE RESEARCH • ENGINEERING • EQUIPMENT

THE DORR COMPANY • ENGINEERS • STAMFORD, CONN.

Offices, Associated Companies or Representatives in principal cities of the world.

PERSONAL NEWS

C. KREMER BAIN, consulting engineer, St. Joseph Lead Co., Bonne Terre, Mo., will return this month to Zellidja, Morocco, to check on progress at installations located there.

Robert K. Heule, Duluth, engineer with the Lakehead Pipe Line Co., who was called back during the Korean war for service in the Navy, has returned from duty and will now be located at Bemidji, Minn., as division engineer for Lakehead.

Dr. John McGlynn, London, Ont., is new resident geologist at the Yellowknife office, replacing **Dr. Arthur B. Irwin.**

D. A. G. Smith has been appointed chief inspector of mines for the Province of Saskatchewan.

W. Holland Smith, former chief engineer at Renabie Mines, Missanabie, Ont., is manager at Keyment Mines in the Bathurst area of New Brunswick. **J. E. McKinney,** who was also with Renabie, is mine engineer.

Reginald F. J. Charlick has been elected president of the Mining Society of Nova Scotia for the year 1953-54.

W. H. Bouck, president of Peach Uranium Mines, has announced the election of **Dr. J. D. Bateman** to the Peach board of directors.

Mrs. Anne M. Logsdon, Spokane, has been elected president of the Prospectors & Mine Owners Association, succeeding the late **A. A. Elmore,** of Wenatchee. **Frank Lille,** Spokane, was elected executive secretary for the twelfth consecutive time.

Charles F. Parker, Jr., is new president of New Idria Mining & Chemical Co., San Francisco. He replaces **Gordon I. Gould,** who resigned as president of the firm and of New Idria Honduras Mining Co., its wholly-owned subsidiary, to devote his full attention to Gordon I. Gould & Co., a consulting firm which he heads. Mr. Parker is former president of Telluride Mines, Inc.

Carmine J. Venuto, formerly with New Jersey Zinc, has joined Foote Mineral Co.'s research and development department as a mineralogist.

Robert S. Shoemaker has joined the minerals research group of Metals Research Laboratories, Union Carbide, at Niagara Falls. Mr. Shoemaker holds M.S. degrees from the University of Wisconsin and Oregon State.

W. A. Sterling, president of Cleveland-Cliffs, has announced the appointment of **J. S. Westwater,** of Ishpeming, to the position of manager of Michigan Mines. He succeeds **F. J. Haller,** who recently resigned to take over the duties of vice president of North Range Mining Co. Announcement was made at the same time of promotion of **Hugo Korpinen** to district superintendent of Michigan Underground Mines and **N. C. Swanson** to district superintendent, Michigan Open-Pit Mines.

Charles M. Shull, Jr. and **W. A. Bates** have joined the staff of the Newmont Exploration Ltd. research laboratory at Grass Valley, Calif.

L. H. Lange, vice-president and manager of the metallurgical division of the Gallagher Co., of Salt Lake City, returned early last month from a year's trip abroad. In the course of his trip, Mr. Lange observed mining operations at Tsumeb Mine in S. W. Africa, where he is consulting metallurgist; in Johannesburg, on the Reef; and in the important mining areas of Australia, Rhodesia, Nigeria and Morocco. He returned via London and New York.

Howard P. Clarke, Duluth, has been elected assistant secretary of United States Steel Corp., assigned to Oliver Iron Mining Division, **R. T. Elstad,** president, announced.

DeWitt L. Morris has been appointed superintendent of Freeport Sulphur's new mining plant at Garden Island Bay, in the Louisiana marshland. **Paul L. Bybee,** former production superintendent at Freeport's Hoskins mine in Texas, has assumed the same duties at Garden Island Bay.

A number of officials of the American Smelting and Refining Co. recently completed official visits at company installations: **J. D. MacKenzie,** vice president, operations, toured the Southwestern and Mexican plants of the company; **E. McL. Tittmann,** general manager, Western department, visited the plants in his department; **J. R. Woodul,** consultant to, and former vice president of the Mexican smelting department, was at the New York office; **T. D. Jones,** traveling lead refinery metallurgist, at the Omaha and Monterrey plants; and **R. L. Jourdan,** ore purchasing manager, toured the West, attending the AMC meeting at Seattle.

W. J. Bennett, president of Eldorado Mining and Refining, Ltd., has been been elected president of Atomic Energy of Canada, Ltd., it was announced by Trade and Commerce Minister **C. D. Howe.** The resignation of **Dr. C. J. MacKenzie** as president of Atomic Energy was effective Oct. 31, 1953.

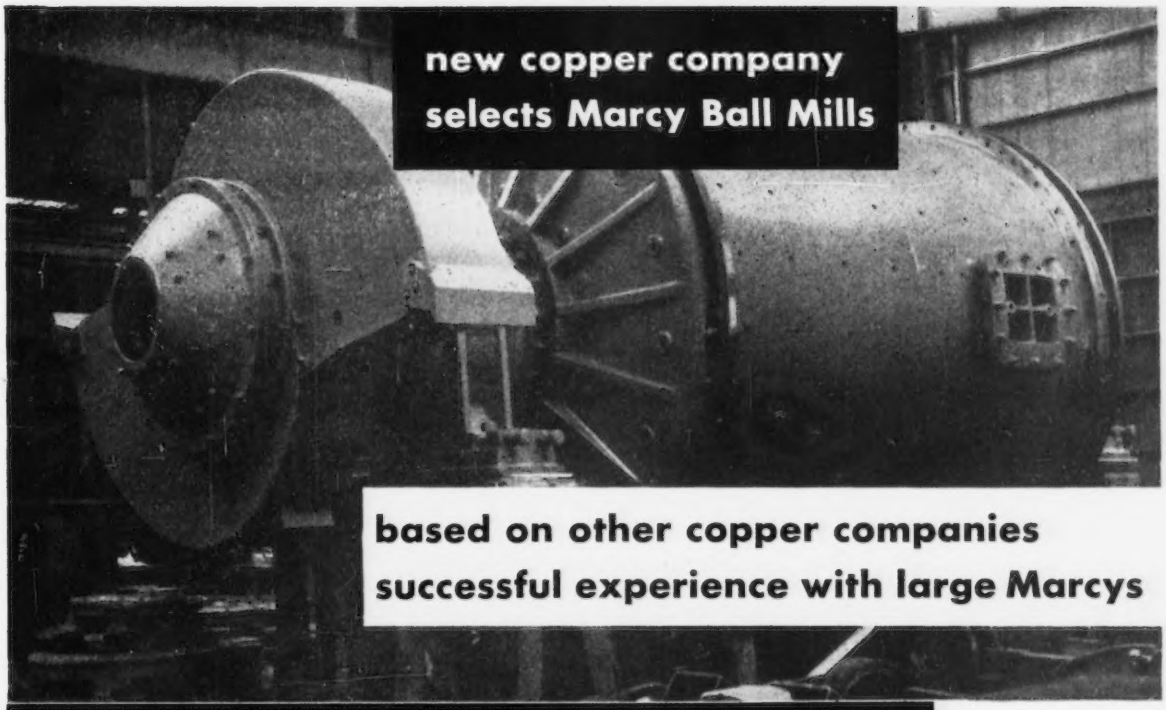
Kenneth J. Weber, Manistique, Mich., mining engineer, is a new member of the engineering department of the M. A. Hanna Co. on the Mesabi.

Eskil Erickson, surface boss at the Homer mine of the Hanna Co, on the Menominee range, has retired after having served the company since 1924.

Prof. A. M. Gaudin, Richards Professor of Mineral Dressing at Massachusetts Institute of Technology, is in Brazil at the invitation of the Conselho Nacional de Pesquisas, for a progress study of research. Other members of the study group are **Prof. Odman,** of Sweden and **Dr. Robert Oppenheimer,** of Princeton.

Robert R. Shrock, chairman of the MIT department of Geology and Geophysics, has announced the appointment of **Herbert E. Hawks** as lecturer and **Gordon J. F. MacDonald** as assist-

B. F. MURPHY, general manager, Southeast Missouri division of St. Joseph Lead Co. at Bonne Terre, Mo., has retired after 43 years of service, the last seven as general manager. He now lives at Brevard, N. C.



20 Marcys on order...16 - 10′ x 10′ and 4 - 8′ x 12′

Here's another typical example of the selection of Marcy Ball Mills based upon proved performance. So many Marcy Mills have been used for so many years by the successful mining companies that they have more than proved their ability to give low cost per ton grinding, to produce a uniform product with minimum overgrind, to give continuous, dependable mechanical operation and capacity.

That's why this new copper company chose Marcy Ball Mills!

You, too, can have all of the advantages of Marcy Mill performance... just write or call for consultation with our experienced grinding engineers.

The Mine & Smelter Supply Co.

DENVER 17, COLORADO

OFFICES IN SALT LAKE CITY, EL PASO, 1745 BROADWAY, N. Y. C.

REPRESENTATIVES IN FOREIGN COUNTRIES

ant professor in the department. Mr. Hawkes was recently chief of geochemical prospecting (USGS) Denver. Mr. MacDonald, a Junior Fellow at Harvard, will join MIT in July 1954. **Louis H. Ahrens**, former assistant professor, has resigned to accept a readership in Mineralogy at Oxford University.

Whitman E. Brown, former metallurgical engineer with the Humphreys Investment Co., Denver, has been appointed mill superintendent for Acoje Mining Co., Inc., Zambales, P.I.

Six new appointments in the Hibbing-Chisholm district of Oliver Iron Mining Division have been announced by **J. H. Hearding**, general superintendent: **Charles M. Gogins** to supervisor-inventory; **Gunnar T. Gunderson**, construction foreman; **Hugo R. Jackola**, underground foreman at the Fraser Mine; **Norman S. Kuntz** to shop foreman; **William J. A. Roberts** to warehouse foreman and **Lloyd F. Hummel** to pipe and plumbing foreman.

Grover E. LeVeque, retiring manager and vice-president of the Minnesota Ore Division of the Jones & Laughlin Steel Corp., was honored at a dinner Sept. 29. More than 80 friends and associates feted the well-known leader. He will continue as an advisor to the company. **Harry F. Kullberg**, Mr. LeVeque's assistant for the past seven years, has succeeded him as manager.

Pickands Mather & Co. promotions on the Gogebic range, as announced by **A. D. Chisholm**, general manager, are: **A. L. Johnson**, operating assistant, Duluth; **John C. Wangaard**, superintendent at the Cary Mine; **Bruce E. Kennedy**, Duluth engineering dept.; and **John L. Sharrer**, to Mr. Kennedy's former post as district mining engineer.

H. E. Treichler, vice president of Texas Gulf Sulphur Co., has retired after more than 35 years with the company. A veteran of many years in the industry, Mr. Treichler has had mining experience in Chile, Canada, and the principal areas of the U.S.

William Knust, advertising manager of National Lead Co. since 1927, has retired after forty-four years with the company. He is succeeded by **T. Howard Sarine**, formerly assistant advertising manager. **Edward A. Olson** takes over the position as assistant.

R. L. Loofbourow, for many years in charge of mining for E. J. Longyear, of Minneapolis, has announced that he is now engaged as a consulting engineer, specializing in underground storage and mine development, with offices at 4032 Queen Ave., South, Minneapolis.

Gov. Dan Thornton has named **Edward D. Dickerman**, of Leadville, and **Dr. W. G. Haldane**, Grand Junction, to serve four-year terms on the State

HARRY L. MILLER, assistant superintendent of mines, American Zinc of Tennessee, at Mascot, is shown examining drift face at the company's North Friends Station mine. Mr. Miller is the author of the paper "Air-Leg Drilling at Mascot, Tenn.," presented at the October 30 meeting of the Southeastern Section, AIME, in Knoxville.

Mineral Resources Board of Colorado. **Harrison Cobb**, of Boulder; **Art Lorenon**, Silverton; and **William J. Schenler**, Pueblo, were reappointed by the Governor.

Frank C. Pickard, former mine superintendent at Tsumeb, SW Africa, has joined Societe Gregg d'Europe, S.A., of Loth, Belgium. He will be at the firm's New York office, 19 Rector street, for two weeks.

Elmer A. Jones is now division manager of Southeast Missouri division, St. Joe Lead, at Bonne. A veteran of 27 years with the company, Mr. Jones was former assistant general manager.

FELIX E. WORMSER, assistant secretary of the Interior, was elected fiftieth Alumni Trustee of Columbia University, New York City. Mr. Wormser is a past president of the New York section of AIMME and a former vice president of the Mining and Metallurgical Society of America.

J. S. Kirkpatrick, vice president, research and development, of Brooks and Perkins, Inc., was unanimously re-elected president of the Magnesium Association at the general session of the association's 9th annual meeting.

OBITUARIES

Frederick E. Hall, one of Canada's most prominent young engineers, passed away at the age of 44. Mr. Hall was stricken while waiting to board a train in Montreal station.

Richard Maize, 77, scretary of the Pennsylvania Dept. of Mines from 1940 to January 1953, died at his home October 10.

A. T. Tye, 79, who retired as assistant superintendent of the Concentrator at Cananea Consolidated Copper Co., in 1947, passed away Sept. 24 in Tucson, Ariz.

LeRoy G. Hetrick, for many years district representative at El Paso, Tex., for the Denver Fire Clay Co., passed away after a stroke October 23. Mr. Hetrick had been associated with the firm for more than 30 years and was well known among mining men.

George Dunn, manager of Canadian Ingersoll Rand Co. in Sudbury for many years, and more recently manager of Chaput Hughes Gold Mines in Kirkland Lake, passed away suddenly of heart failure at the age of 63.

Charles A. Sheahan, 59, manager of Cochenour Willans Gold Mines in the Red Lake area, died suddenly in his hotel room in Toronto Sept. 17.

Martin R. O'Shaughnessy, 84, veteran of 50 years experience in the mining fields of Northern Ontario, died in Sudbury.

Robert J. Bonnemort, 69, mining engineer, died at his home in Kaysville, Utah, on Oct. 14, of a heart ailment. He was affiliated with the Benguet Mining Co. (Philippines) to World War II, when he and his family were interned by the Japanese.

E. J. Franklin, long-time chief mechanical engineer for Utah Copper Co., and consulting power plant engineer for Kennecott's Chino, Nevada Mines division and Ray Consolidated, died Oct. 3 at Encino, Calif.

W. McC. White, 92, prominent Butte mining operator, died suddenly there on Oct. 18 as a result of an automobile accident.

W. J. Phillips, 72, former chief chemist at Oliver Iron's Dober Mine, Stambaugh, died in California on Oct. 8.

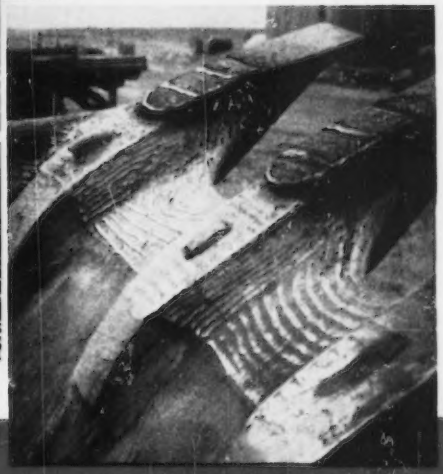
H. C. Burrell, 50, world-renowned discoverer of Cerro Bolivar, collapsed and died Nov. 9 in Pittsburgh of coronary thrombosis. Mr. Burrell, who was manager of raw materials development for U.S. Steel, was visiting the firm offices.

THE NEW COATED TUBE STOODITE!

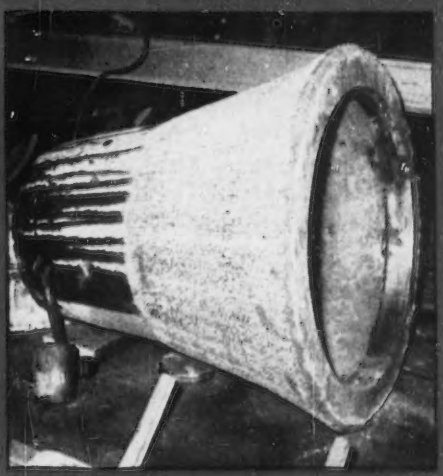
(STOODY 1293)

UNBEATABLE FOR HARD-FACING CRUSHERS AND SHOVELS!

JAW CRUSHERS



SHOVEL BUCKETS AND TEETH



GYRATORY CRUSHERS

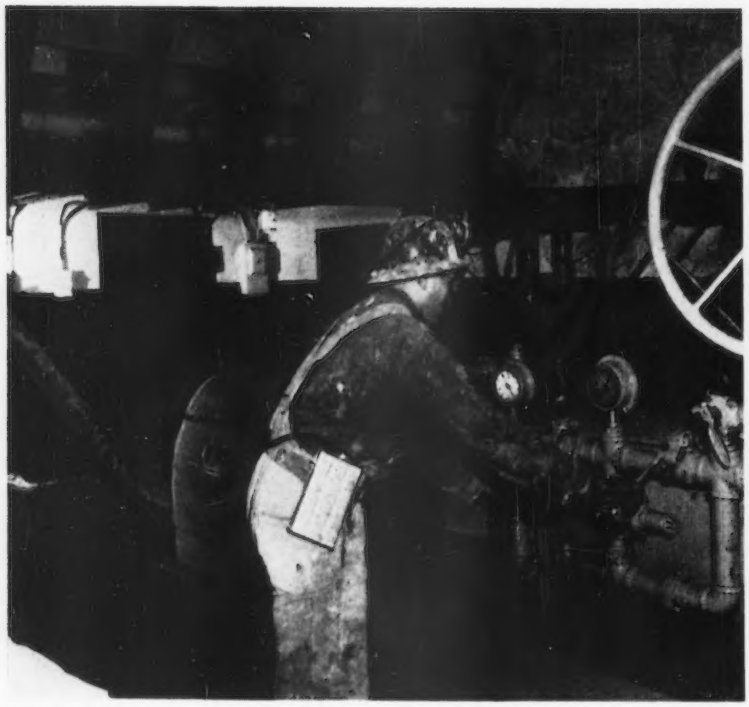
Here's a new low cost, high alloy electrode that licks crusher and shovel maintenance! Possesses unusually high wear resistance, has the impact and compressive strength to stay put and hold up longer on all types of heavy equipment!

Designed for ultimate weldability and application speed. Thoroughly proven—field tested for 2 years... does the work of electrodes costing *TWICE* as much! *USE COATED TUBE STOODITE* on all your heavy equipment... in MINING, EARTH-MOVING, OIL FIELDS, QUARRIES, CRUSHING PLANTS, ETC.!

TEST IT YOURSELF! *Try a 50 lb. carton. Compare COATED TUBE STOODITE with other rods, regardless of price! See your Stoody Dealer (listed in the "Yellow Pages" of your phone book, or write for literature.*

STOODY COMPANY 11940 East Slauson Avenue, Whittier, California

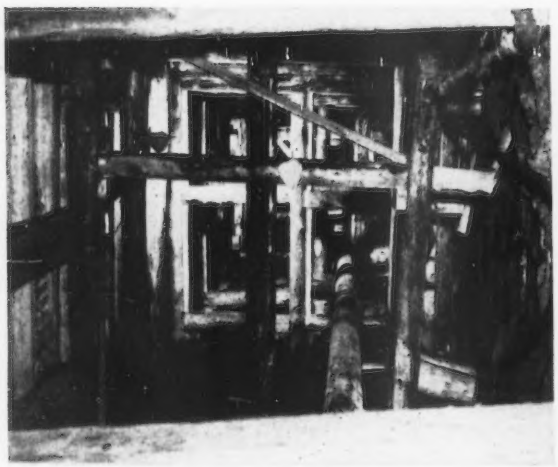
THIS MONTH IN MINING



INTERNATIONAL NICKEL Company of Canada uses a system of blowing concrete through pipe from underground mixing stations into construction forms to line shaft and drift walls at its Creighton Mine. Operator (above) turns on compressed air in a placer charged with concrete.

DOWN INTO MINE runs 6-in. steel pipe carrying "air borne" concrete. Perhaps ¼-mi. away, concrete will empty directly into construction form.

Inco's Creighton Mine Uses Air-Borne Concrete



IN NO. 3 SHAFT collapsed and broken timbers have been removed and bracing erected to support forms for lining a new slusher drift with concrete. Best "up" delivery thus far was total of 1,315 ft. from the 20 placer level.

CONCRETED WALLS and back have converted abandoned workings into slusher drift. Pneumatic system is expediting Inco's program of mining by induced caving. Caving project has daily quota of 12,000 tons of ore.

U. S. Foreign Mining Investments Decreased Slightly In Past 20 Years

VALUE OF U.S. INVESTMENT in foreign mining and smelting has decreased slightly during the past 20 years. This is revealed by the Commerce Department in one of the most complete studies ever made on U.S. foreign investments. The total dropped from $1.18-billion in 1929 to $1.12-billion in 1950.

Most important trend disclosed is the movement of U.S. mining investment from the Western Hemisphere to Africa. It's a slow trend however. In 1950, 85% of total investments were still in the Western Hemisphere. Two decades earlier, the total had been 96%. From 1943 to 1950 alone, U.S. mining investments in Africa increased from $23-million to about $65-million. Since then post-Korea investments—not included in the Commerce study—has added to the total.

About three-fourths of the 1950 investment was in base metals other than iron. Remaining investment was almost evenly divided among nonmetallics, precious metals, and iron ore. Iron ore investment is cited as a major development, and is centered for the most part in Labrador, Venezuela, and Liberia, and to a lesser extent in Chile and Cuba.

Investment in precious metals has dropped the most over the past 20 years. It represented 20% of total U.S. mining investments abroad as lately as 1936. By 1950, the total was less than 7%.

Lead-Zinc Committee Asks 50% Tariff Boost

NATIONAL Lead and Zinc Committee has asked the Tariff Commission to recommend a 50% boost in levies on lead and zinc imports over Jan. 1, 1945 rates. This step was urged at hearings in Washington in early November.

Tariff Commission is making a general investigation of the impact on domestic industry and consumers of lead and zinc imports at the request of Congressional committees.

The Congressional committees will study the Tariff Commission's recommendations for possible action at the next session of Congress which convenes in January.

U. S. Cancels Mn Pact Says Firm 'Defaulted'

GENERAL SERVICES ADMINISTRATION announced in November that it had cancelled its manganese production contract with Westmoreland Manganese Corp., Batesville, Ark., because the firm "defaulted" on contract terms.

GSA foreclosed on a mortgage held by the government on the company's plant and equipment. Under the April 1952 contract, Westmoreland was to have produced 264,000 tons of processed manganese ore within six years after production began, or by June 30, 1959.

Edmund W. Mansure, GSA administrator, said that no ore had been delivered and that construction called for in the contract has not been delivered.

Anaconda's New Plant Opened at Weed Heights

ANACONDA COPPER CO. on Nov. 10 formally dedicated its new plant and facilities at Weed Heights, near Yerington, Nev.

MILLAR

Addresses were made by A. E. Millar, general manager, Anaconda's Nevada operations who served as master of ceremonies; Governor Russell of Nevada; Sen. Pat McCarran (D., Nev.), Robert E. Dwyer, Anaconda president, and C. E. Weed, vice president in charge of all Anaconda operations.

The new plant will leach a deposit of copper oxide and carbonate ore containing an estimated 35-million tons. Plant has a rated daily capacity of 11,000 tons and is now in production. Copper precipitates will be shipped to the Anaconda Smelter at Anaconda, Mont., for final processing.

Annual *E&MJ* Index Appears This Month

The E&MJ annual index may be found in this issue opposite page 174. The index is published as a convenience for those of our readers who keep E&MJ issues for reference.

Mining Calendar

Colorado Mining Association, Shirley Savoy Hotel, Denver, Jan. 28-30

AIME National Convention, Hotel Statler, New York City, Feb. 15-18

News Highlights

M. J. Boylen visits *E&MJ*. Page 122.

Outlook for the Illinois-Kentucky fluorspar industry in dark. Page 130.

Sunshine Mining Co. is reaping benefits from revised metallurgical procedures at its big concentrator plant on Big Creek between Wallace and Kellogg, Ida. Page 132.

Minnesota State Executive Council in a "precedent-setting action" has voted to permit three firms to convert iron ore leases to less expensive taconite leases. Page 146.

A substantial expansion of North Carolina's mica mining industry is expected. Page 154.

Gold Hill District of Utah is enjoying a mild boom. Page 156.

A new threat to mining in Washington's Metaline District has loomed. Page 158.

Milling by Opemiska Copper Mines Ltd. in Quebec is expected to start this month. Page 161.

In New Brunswick, a year of grace has been given on assessment work which should have been completed by October 31. Page 163.

What appears to be major deposits of titaniferous ores have been discovered on the coast of South Africa. Page 166.

Freeport Sulphur Co.'s Garden Island Bay Plant in Louisiana is nearing completion. Page 168.

Australia's "uranium fever" is gathering momentum. Page 174.

A Japanese mining consultant is advising Yugoslavia how best to develop large copper deposits in eastern Serbia. Page 178.

DMEA further restricts supports for vital metals program. Page 180.

Andrew Fletcher repeats warning that unneeded imports are wrecking the domestic lead-zinc industry. Page 180.

President Eisenhower names committee to study metals mining policy. Page 184.

Swedish geologists have made what they consider to be important finds of copper and zinc. Page 188.

M. J. BOYLEN (seated) points to the area of his New Brunswick holdings for the benefit of Jack Kearney (left) and Bob Ramsey, of *E&MJ*

"One Man Mining District" Visits *E&MJ*

M. J. BOYLEN, whose faith in New Brunswick has helped make that Province one of the most exciting in Canadian mining history, was in New York recently and dropped by *E&MJ* offices to say hello.

More than any other individual, it has been Boylen with his unresting energy and boundless enthusiasm, who has drawn the mining industry's attention to New Brunswick.

A list of all properties in which Boylen has an interest would read like a mining directory. He is president of Anacon Lead Mines, United Montauban Lines, Brunswick Mining & Smelting Corp., Chibougamau Explorers, Keymet Mines, Maritime Mining Corp., Bathurst Mining Corp., and the New Larder "U" Island Mines.

During his 32 years in mining, Boylen has taken part in most of the major mining events of Eastern Canada.

Boylen was born in Weston, Ontario, Aug. 10, 1907. On that very day an event occurred which brought him a major orebody.

On that day a steel company which Boylen preferred would remain unidentified abandoned a New Brunswick area after their seventh core had produced nothing promising. With a chuckle, Boylen said that the steel company missed a major orebody by only 35 ft.

"I surveyed that country," Boylen said, "and the rocks looked good and juicy. I was sure there was ore there. So we started drilling in December 1952. And we struck it."

While today Boylen has realized good fortune which haunts the dreams of most prospectors, it has been a long haul.

He has been prospecting since 1921, when he left home at the age of 14. Today, 32 years later, he has staked or acquired and has participated in the bringing-in of 10 mines.

Boylen is enthusiastic about all of his properties but particularly about his New Larder "U" Island Mines.

"Just the other day," Boylen said, "we entered what looks like the best hole we've had so far. It entered our ore zone at 950 ft. and the drill has been in ore for 158 ft.

"We're getting high grade lead and zinc, and copper, pyrite and silver at New Larder "U" plus a recoverable amount of tin."

Today, the man who ran a general store in the mid-20's can look out over his rapidly expanding mineral empire.

This same man can recall taking mining textbooks with him into the bush to augment his meager formal schooling. And yet only recently the University of New Brunswick awarded him an honorary degree, Doctor of Civil Laws.

Boylen considers himself an "old time" mining man and doesn't wear the title of "Doctor" too comfortably. He much prefers the title a Toronto friend smilingly gave him—"M. J. Boylen, the One Man Mining District."

Diamond Drill Symposium Yields New Idea Harvest

A BORE-HOLE CAMERA capable of photographing the interior of a drill hole at any desired point was just one of the new ideas under discussion at the fifth annual Diamond Drilling Symposium sponsored by the Center For Continuation Study of the University of Minnesota, and held in Minneapolis Oct. 8-10.

Attended by more than 100 registrants, the sessions covered aspects of exploration drilling in such widely separated areas as the Colorado Plateau, the California oil fields, the Lake Superior region, and the Canadian gold fields.

Discussions centered on the use of air, water or natural gas as hole-cleaning agents; on the optimum rotary speed and bit pressure; on the proper adaptation of technique to different kinds of rock; and on the characteristics of different kinds of bits and steels. There seemed to be little unanimity of opinion on these matters, inasmuch as each area seemed to have its own problems and its own way of handling them.

Two opinions that seemed generally held, however, were that air is not satisfactory for cleaning wet holes, and that rotary drilling costs, on an average, about $1.50 per ft.

Robert H. Nesbitt, geologist with the U. S. Army Engineers, described the bore-hole camera. Built into a metal tube 31 in. long and 2¾ in. in diameter, the camera fits into an NX bore-hole, which is 3 in. in diameter. The camera is focused for ⅛-in., although longer focal lengths can be supplied to take care of cavities in the hole wall.

Pictures are taken continuously as the camera is lowered into the hole. Cost of operation is estimated at about $0.60 per ft., with a purchase price of around $5,000.

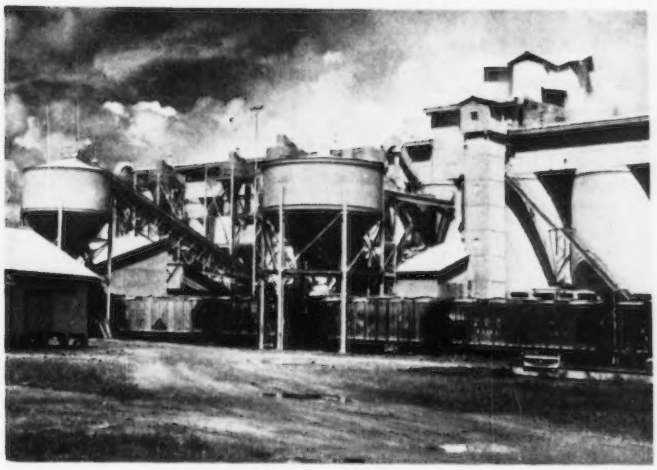
Robert Carver of Sprague and Henwood, reported on diesel vs. gasoline power in drilling, pointing out that his company drilled one property with a diesel rig at a fuel cost of $0.62 per shift, although other rigs in the area, using gasoline engines, ran up fuel costs of $3.50 per shift.

In discussion, most participants agreed that diesel power was more economical. One man reported that his cost of conversion from gasoline to diesel ($4,000) was recovered in 14 months through savings in fuel cost. Another said he amortized his conversion cost in 6 months, and still another in 17 months. All agreed that a major item of expense with gasoline was the "spillage" into the gas tanks of the drill operators' personal automobiles.

One man reported improved results with use of a torque converter drive with a diesel engine, and other reported tests with various types of fluid coupling.

Largest Pulverizer in Florida Phosphate Field

...Doubles Production for Pierce, Florida Plant of The American Agricultural Chemical Co.!

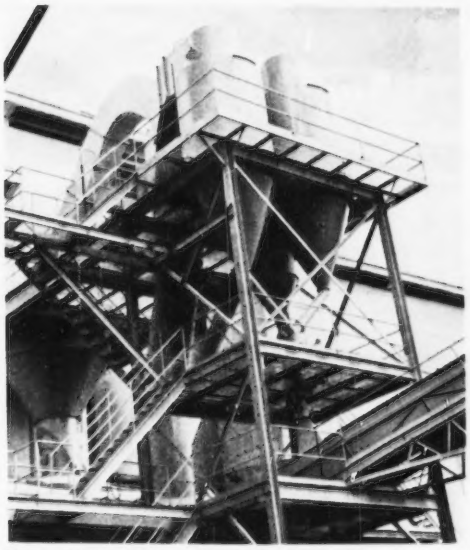


The American Agricultural Chemical Co. Grinding Plant—Pierce, Fla.

To meet a large increase in demand for ground phosphate, The American Agricultural Chemical Co. found it necessary to double the grinding facilities of their Pierce, Fla. operations. After a careful study of available systems, the Kennedy Air Swept Ball Mill System was chosen as the one best suited to grind pebble, concentrate, or a combination of both at the lowest cost. Dependability, continuity of operation, lower power, maintenance, and operating labor costs were the prime factors in their decision.

The ball mill has long been used in many industries where comtinuous production with minimum maintenance and operating supervision is required to keep production costs to an absolute minimum. The simplicity of the ball mill, both in design and operation, makes it the ideal pulverizer.

The Kennedy-Van Saun Air Swept Ball Mill Grinding System is the ultimate in Ball Mill Systems. The Kennedy Radial Flow classifier makes possible production of a wide range of product sizes, by positive external adjustments, to a high degree of accuracy.



Kennedy-Van Saun 11' Radial Flow Classifier and Cyclone collectors.

- *LOWER MAINTENANCE* Tramp iron, manganese, and other foreign material cannot damage system. *No magnetic separation required.*
  Grinding balls added while mill is in operation, maintaining constant level of grinding media. Production and fineness remain constant, month after month. No periodic shut-down for lubrication or replacement of wearing parts. Years of operation assured before parts (other tha ngrinding balls) require replacement.

- *MINIMUM POWER*
- *LOWER OPERATING COST* Dependability of equipment and reliable automatic feed control assure high production with minimum operating personnel.

- *HIGHER PRODUCTION* Single grinding unit capacities to 75 tons per hour, requiring less floor space and structural work per ton of production.

- *FLEXIBILITY OF DESIGN* Kennedy-Van Saun Air Swept Ball Mill Grinding Systems available in a wide range of capacities to meet your requirements.

Send for illustrated literature describing K.V.S. machinery and equipment.

IT COSTS LESS.. TO OWN THE BEST!

KENNEDY-VAN SAUN
MANUFACTURING & ENGINEERING CORPORATION
TWO PARK AVENUE, NEW YORK
FACTORY DANVILLE, PA.

U.S. ROYAL

CON-TRAK-TOR

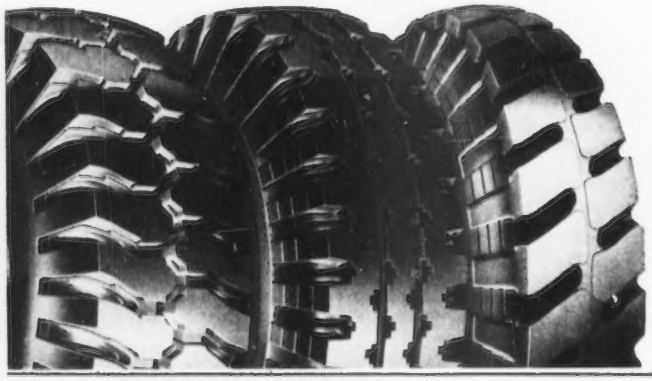
FULL LUG

Saves on Tire-Bruising Hauls!

The rougher your hauling jobs, the more you need the Con-Trak-Tor! It's built to *take punishment*—with triple-impact protection: extra rubber between plies, double shock-pads, rock-resister cap plies. It's built to *deliver traction*—with exclusive full-lug design. Mount it—and *save* from that day on!

Also available in All-Nylon for heaviest duty

Get Full Proof—Phone your U. S. ROYAL Dealer Now!



Specialized by U. S. ROYAL to do your jobs better!

U. S. ROYAL FLEETMASTER
Smooth rolling *on* the road, superior traction *off*. 70% more tread depth!

U. S. ROYAL ROAD TRACTION
New steering ease where most hauling is on-road at reasonable speed.

U. S. ROYAL LUG TRACTION
Best for high traction at low speeds off the road or on unimproved roads.

U. S. ROYAL TIRES *Product of* UNITED STATES RUBBER COMPANY

Austria's Erzburg

Europe's Largest Open-Face Working Makes Full Recovery After Russians 'Liberated' Most of Best Equipment

MOUNTAIN has been mined continuously for 2,000 years yet still holds some 350-million tons of profitable iron ore.

AUSTRIA'S ERZBURG, largest open-face iron working in Europe, is now producing some 8,000 metric tons daily, after being crippled by Russian theft of mining machinery after World War II.

Physician responsible for Erzburg's speedy recovery, Austrians freely admit, was ECA/MSA, which prescribed large doses of United States equipment. Miners talk now of a daily goal of 9,200 tons. Erzburg, which means Ore Mountain, accounts for 87% of iron ore production in Austria, one of the foremost exporters of pig iron.

Erzburg ores occur largely as siderite and average 32% Fe. Also, analysis disclosed 2% manganese, .03-04% phosphorus and .03-06% sulphur. Only about a quarter of the tonnage mined is merchantable.

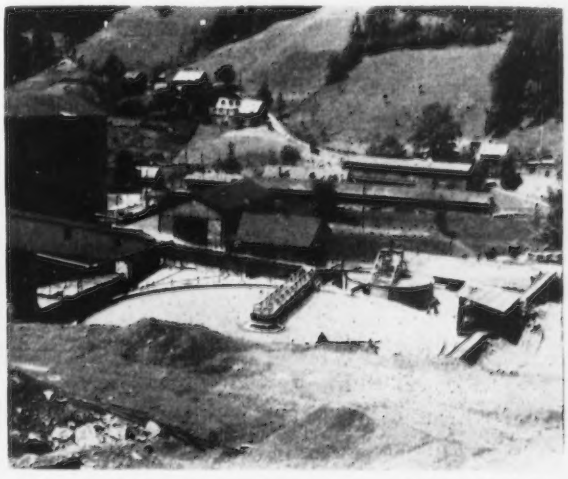
Snow blankets the mountain (see cover picture) from mid-November to mid-March. Miners take the snow-ice hazards in stride, however, since the most popular hobby among them is mountain climbing. Snows—up to 7 ft.— keep snow plows busy clearing roads and mining areas. In the spring, melting snows deteriorate roads and two 14-ton street rollers are used.

Most mining is done on 34 78-ft. benches. About 25% is underground. Some 4,000 miners are employed. During World War II, Hitler tried to boost output by using women on many jobs, including hand-picking ore.

Mining at Erzburg has been in continuous operation for 2,000 years. During that time, man has chewed off 60 feet from the top of the mile-high mountain and has produced about 250-million tons of iron ore.

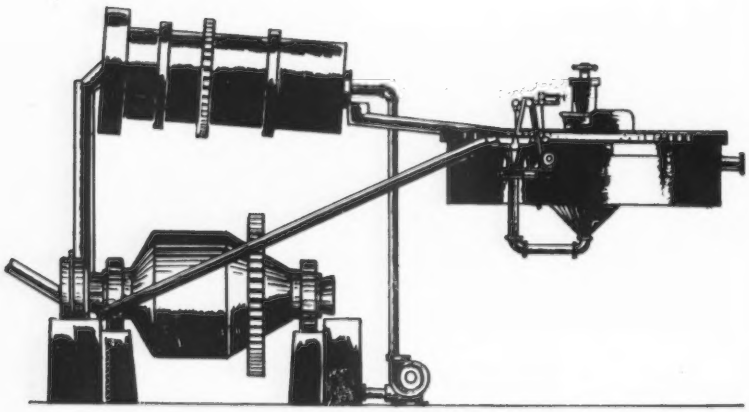
Geologists estimate that there are some 350-million tons left—300-million reachable in the open. That would mean more than another 100 years of profitable mining.

AVERAGE DAILY OUTPUT for January-August 1953 was 7,951 for an eight months total of 1,590,140 tons.



CRUSHING, flotation and concentrating facilities hug the base of the mile-high Erzburg.

HARDINGE CLOSED-CIRCUIT
WET-GRINDING SYSTEM



The Hardinge wet-grinding circuit illustrated here is capable of producing an end-product in the range of 28 mesh without Hydro-Classifier and as fine as 10 microns with Hydro-Classifier. It provides positive control of sizing and moisture.

The Conical Mill discharges to a Counter-Current Classifier which returns the oversize by gravity to the feed end of the mill for regrinding. For ultrafine products, the Counter-Current Classifier product goes to a Hydro-Classifier for further separation. The oversize is returned to the mill or used as a secondary, uniform product. Bulletin 39-B-1.

HARDINGE
COMPANY, INCORPORATED

YORK, PENNSYLVANIA · 240 Arch St. · Main Office and Works

New York · Toronto · Chicago · Hibbing · Houston · Salt Lake City · San Francisco

IN THE U.S.

ALASKA

● **Kenai Chrome Co.** has started production at its property on Red Mountain near Seldovia. The first ore was to be shipped Oct. 1. Trucks take the ore to the beach where it is moved by conveyor belt to the dock. An aerial tramway is to be built. The chromite ore may be sent to either Seattle or Portland according to the contract of the company with the Federal Government.

● **A premature explosion** of dynamite at United States Tin Corporation's mine at Lost River reportedly caused the death of James Allio, 27, on Oct. 24. Paul Black of Mullan, Idaho, who was seriously injured, was sent to the Nome hospital, 100 mi. southwest of Lost River, for treatment.

● **Admiralty Alaska Gold Mining Co.** is reported from Juneau to have opened a 50-ft. vein this season carrying high values in gold and other minerals. The property is being developed by Henry Roden, president, and Sam Pekovich, manager, with the assistance of a Federal loan.

● **Empire Tin Mining Co.'s** property on Seward Peninsula has been optioned by a syndicate of Seattle and Alaska business men. An exploration syndicate will be organized to continue the drilling begun by the U. S. Bureau of Mines about five years ago. Discovery of columbite, tantalite, and other raw minerals brought about the decision, according to Willis T. Batcheller, consulting engineer. The group hopes to prove the existence of tungsten, titanium and chromite in the district.

● **Zenda Mining Co.** plans to explore large deposits of tin in the Cape Mountain district (see *E&MJ*, November 1953, p. 100). Drilling of rich gravels on Cape Creek warrants installation of a plant, according to B. M. Snyder, vice-president, and production is expected to start late next year. Mr. Snyder gave much credit to the DMEA program for its help in finding deep channels of tin placer deposits on part of Seward Peninsula.

● **It is reported** that Aluminum Company of America still hopes to carry out its huge Taiya project in the Skagway District even though Canada has turned down its proposal to use water from the Yukon.

ARIZONA

● **New Jersey Zinc Corp.**, has signed a contract with Verde Exploration Ltd. to spend a minimum of $50,000 a year for three years and a maximum of $1-million in search of copper veins in the Jerome area.

Should a paying vein be located, New Jersey Zinc would acquire 51% of VE stock, according to Clarence J. Beale, manager of the exploration company.

The exploration company bought the liquidated Clemenceau Mining Corp., previously the United Verde Extension Corp., in 1947 for $110,000 and since has spent in excess of $400,000 probing for profitable copper deposits.

Jerome once was the copper center of Arizona. Since closing of operations by Phelps-Dodge Corp. in 1950 extensive exploration has been conducted.

More than seven holes have been spotted for drilling to 800 ft.

● **A new corporation** to dispose of the $25-million abandoned smelter at Clarkdale, has been organized at Phoenix following purchase of the smelting plant and town by W. L. Allison, head of Allison Steel Manufacturing Co., Phoenix.

● The government has signed a three-year contract with Riviera Mines Co. of Phoenix for producing 3-million lb. of refined copper from the Christmas Mine in the Banner Mining District of Gila County near Winkleman. Riviera is a newly-formed company headed by W. L. Allison of Allison Steel Manufacturing Co., Phoenix.

Government will pay Riviera 32c. a lb., less differentials, for the metal. Production calls for 600,000 lb. this year and 1,200,000 lb. for each of the next two years. General Services Administration said an earlier contract for copper from the Christmas Mine, held with the Sam Knight Mining Lease, Inc., of Winkleman, terminated when price controls were removed from copper last February. The Knight contract had called for 2,390,000 lb.—about 1,150,000 of which was produced before the contract expired. Since taking over the Christmas, Riviera has constructed a mill at the mine. Previous smelting was done by American Smelting & Refining Co. at Hayden.

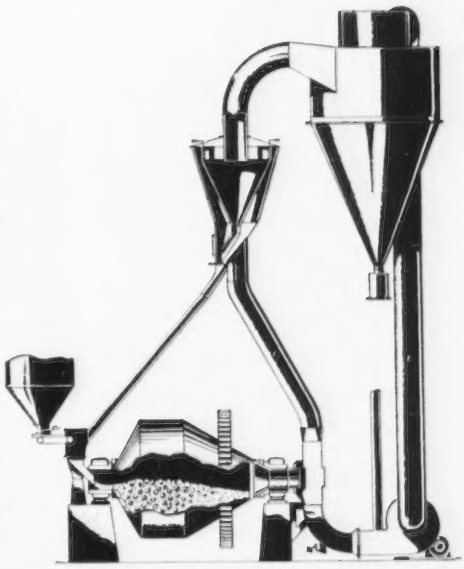
CALIFORNIA

● **A $73,571 exploration program** is under way at Mt. Diable quicksilver mine near Clayton in Contra Costa County. A DMEA loan covers three-fourths of this amount. Ronnie Smith, Dallas, Texas, holds the lease on the mine and the adjoining rotary furnace plant with a 50-ton per day capacity.

In the search for new orebodies a vertical two compartment shaft is being sunk from elevation 900 at the surface. Some 300 ft. below the collar a 125-ft. crosscut will be run to the ore zone and 500 ft. of drifting will be done in the ore zone. The shaft is going through the hanging wall.

The new level—elevation 600—will be 100 ft. deeper than the lowest level previously worked, according to C. N. Schuette, consulting engineer on the

HARDINGE CLOSED-CIRCUIT DRY-GRINDING SYSTEM



One of the preferred dry-grinding arrangements is the closed grinding circuit illustrated here: The Conical Mill has a gravity overflow discharge. The product is pulled into the vertical air stream at the mill discharge due to a drop in air pressure at this point. The Hardinge Air Classifier separates a product as fine as 99½% passing 325 mesh or as coarse as 35 mesh if desired, returning the oversize to the mill.

The entire system is closed, except for the feed end of the mill. A negative pressure is maintained in the air conveying system which makes the entire operation dust free. Bulletin AH-449-1.

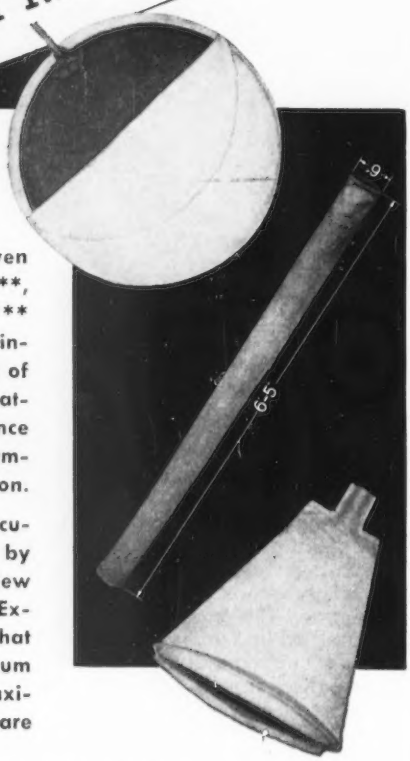
HARDINGE
COMPANY, INCORPORATED

YORK, PENNSYLVANIA · 240 Arch St. · Main Office and Works

New York · Toronto · Chicago · Hibbing · Houston · Salt Lake City · San Francisco

- Vacuum and Pressure Filter Element Covers
- Dust Collector Tubes, Bags and Envelopes
- Anode Bags

Let US make up your Element Coverings from NFM Filter Media



NFM Filter Media are woven from Nylon, Orlon*, Vinyon N**, Saran, Glass, Dynel, Vincel*** and Cotton. This wide range insures your obtaining the type of element covering having the greatest degree of chemical resistance and best general all round performance for your particular operation.

NFM element coverings are accurately and durably fabricated by skilled personnel at both our New Haven and Salt Lake plants. Experience has demonstrated that filter cloth costs are at a minimum and filter performance at a maximum wherever NFM products are employed.

If you are not absolutely certain as to which type of synthetic or natural fiber is best for your use send us a complete description of your operating conditions and we'll be glad to make a recommendation. Our many years of experience mean that we have quite a fund of knowledge always at your disposal.

*T.M.—E. I. Du Pont de Nemours & Co., Inc.
**T.M.—Union Carbide & Chemical Co.
***T.M.—Reg. U. S. Pat. Off.

Weavers of Industrial Filter Media for over Forty Years

NFM The National Filter Media Corp.

General Offices & Mills: New Haven 14, Conn.
Western Office & Factory: Salt Lake City 1, Utah

Sales Offices—Representatives

Chicago, Ill. 2627 West 19th St. | Cincinnati, Ohio Roselawn Center Bldg. | Houston, Texas 1406 Second National Bank Bldg. | Oslo, Norway Nicolai Friis | Johannesburg, South Africa Edward L. Bateman

California *(Continued)*

job. Sinking was started following erection of a 40-ft. headframe and installation of a 50 hp. hoist. Plans call for completion of the shaft sinking by the end of the year, and crosscutting and drifting are slated for completion by April 1954. Guy A. Castle and Melvin Bruner, Angels Camp, hold the contract for sinking.

COLORADO

● **Vanadian Corporation of America** has begun operation of a roaster for orebearing uranium and vanadium, at its Naturita mill, W. C. Keeley, president, announced. Construction of the roaster, approved by the Atomic Energy Commission, was completed in 80 days by the company's 120 employees at Naturita.

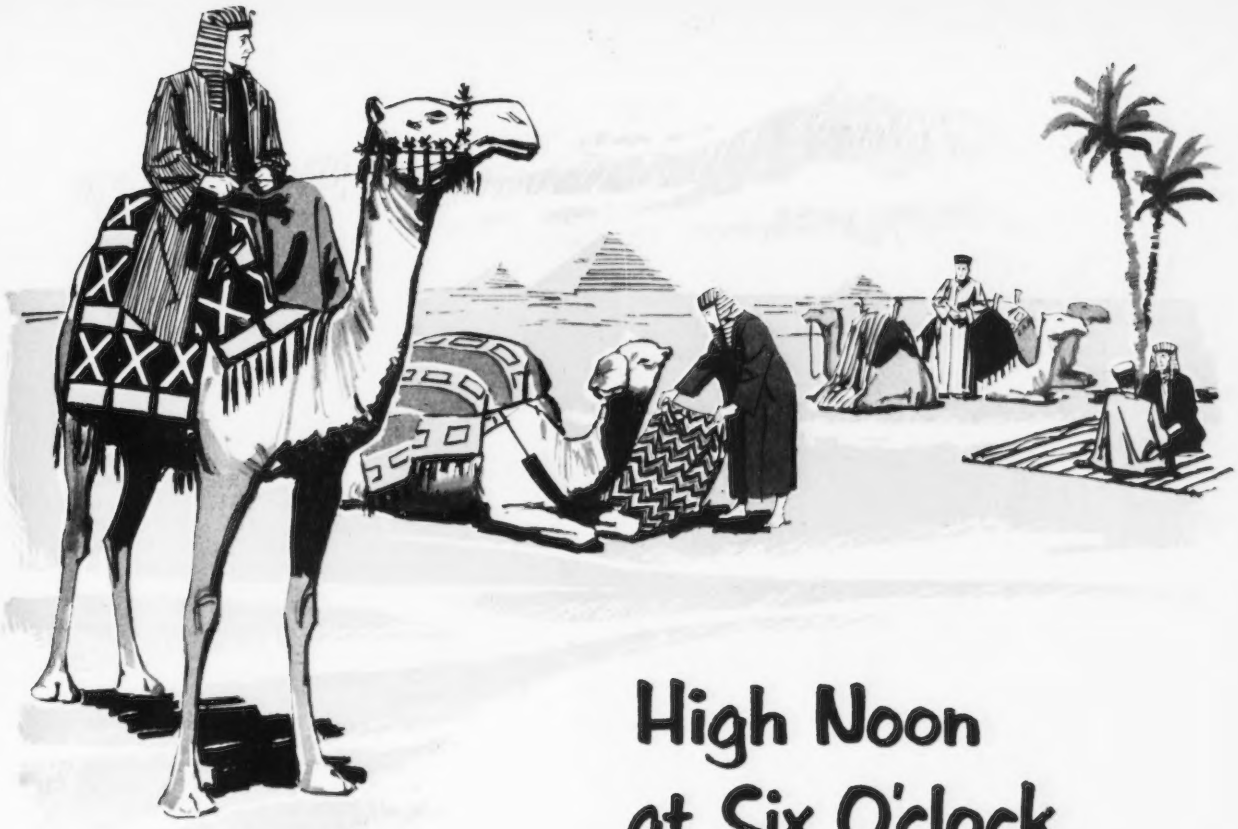
The third installed at Naturita, the roaster increases by 80% the capacity of the mill.

● **Golden Cycle Corp.** of Colorado Springs is sinking a shaft on Atkinson Mesa near Uravan, to mine uranium ore. To date, the shaft is down approximately 480 ft., leaving an additional 255 ft. to be sunk before mining operations can commence. Total expenditures to date in this uranium development are approximately $83,000. The corporation will spend between $175,000 and $200,000 to bring this property into production. Merrill E. Shoup, Colorado Springs, is president.

● **Atomic Energy Commission** has issued a request for bids covering a minimum of 20,000 ft. and a maximum of 30,000 ft. of core and noncore drilling to be performed in the Carlile District, Crook County, Wyoming. Bid forms and specifications may be obtained by writing to the U.S. Atomic Energy Commission, P.O. Box 7647, Lakewood Branch, Denver.

● Small shipments of high grade ore have been made regularly from the rich vug area discovered recently by Golden Cycle Corp. on the 31st level of the Ajax mine, it was revealed at Cripple Creek by M. H. Grice, mine superintendent. Values of the shipments have ranged from $1.25 to $5.50 a pound. Many tons of ore which reportedly may be worth anywhere from $700 to $2,800 a ton remain in the stope and will be pulled gradually as shrinkage requires.

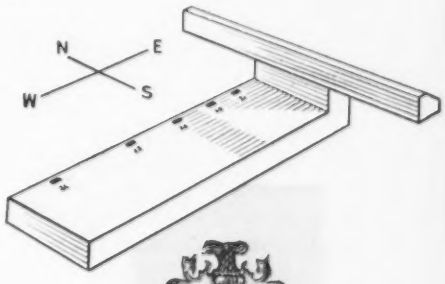
● **Rico Argentine Mining Co.** has continued a two-fold exploration and development program in the Wellington Mine. A second project is the rehabilitation of the St. Louis tunnel, now in 5,300 ft. Some 3,500 ft. of additional tunneling will be carried out in an area in which ore has been indicated by diamond drilling. Rico Argentine now mines 150 tons of lead-silver-zinc ore daily. Sherman B. Hinckley of Rico is manager.



High Noon at Six O'clock

. . . and time for the Siesta

Man's constant striving to keep track of time produced countless varieties of shadow-clocks of which the familiar garden sun-dial, being only a thousand years old, is the newest. Three thousand years ago, the Egyptians used a bar-type shadow-clock placed with the crossbar at the east end of the metered slab in the morning and reversed at noon. It measured the daylight hours in two groups of six, noon being the "sixth hour." A thousand years later, the Romans were still calling it the sixth hour—in Latin, "Sexta Hora"—which the Moors and Spaniards shortened to "Siesta," still meaning noon-hour and rest. Today, time is so valuable that we measure it with meticulous accuracy, expend it sparingly, save it wherever possible. In the drilling business, a good way to save time is with Truco Diamond Bits. Their irresistible cutting power penetrates any formation, swiftly, accurately, thriftily, dependably. They are used profitably in every phase of drilling. Have you looked in our catalog lately?



WHEEL TRUEING TOOL COMPANY

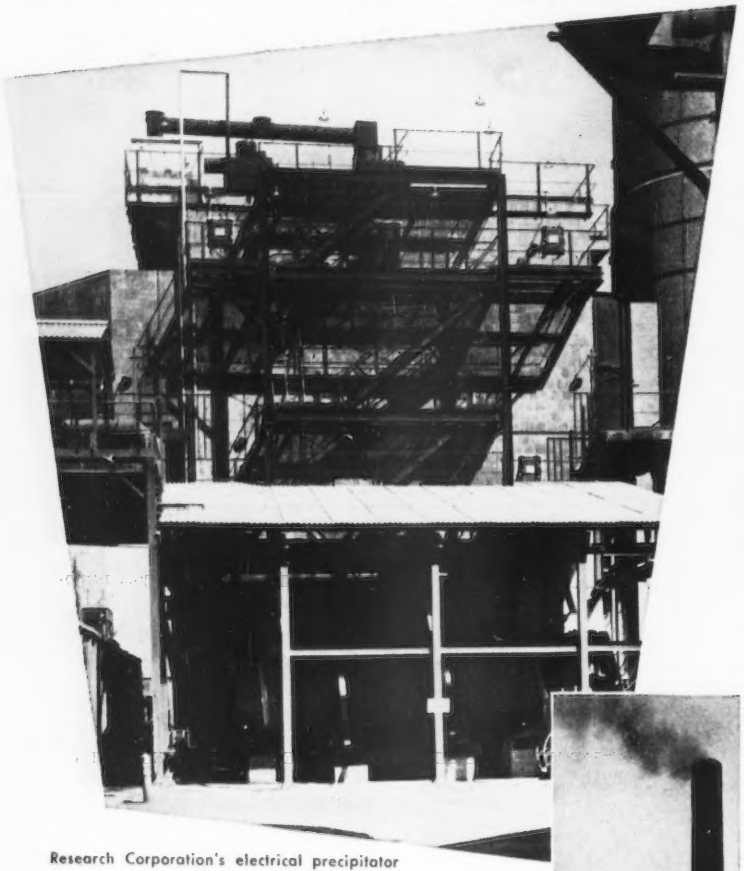
3200 W. Davison Avenue, Detroit 6, Michigan

WHEEL TRUEING TOOL CO. OF CANADA, LTD.

575 Langlois Avenue, Windsor, Ont., Canada

New Jersey Zinc

Recovers Values from Fume

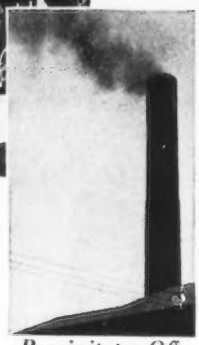


Research Corporation's electrical precipitator installation at the Palmerton, Pa. plant.

The two photographs (right) show the results of this Research Corporation installation. The smoke in the picture at the top (Precipitator Off) consists of dry dust and fume entrained in the zinc ore sintering machine gases.

The picture at the bottom (Precipitator On) shows nothing but water vapor escaping from the same stack.

If you have a fume problem that involves recovering valuable materials that are going up the stack or combating a smoke nuisance, get in touch with your nearest Research Corporation representative. His experience with over 300 roaster and metallurgical precipitators will enable him to advise you on the most effective—and economical solution to your problem.



Precipitator Off

Precipitator On

RESEARCH CORPORATION

405 Lexington Avenue, New York 17, N. Y. • Bound Brook, N. J.
Grant Building, Pittsburgh 19, Pa. • 122 South Michigan Avenue, Chicago 3, Ill.

Colorado *(Continued)*

● **Shattuck Denn Mining Corp.** is sinking a vertical shaft on its 157-acre lease 4 mi. from Uravan, and west of the La Sal Mining Co.'s property. Shattuck Denn was awarded the lease by the Atomic Energy Commission. The shaft will be sunk 500 ft. to the uranium-vanadium ore which has been indicated by AEC surface drilling. T. W. Newell has been transferred from Bisbee, Arizona to supervise the new development.

● **Dr. Wm. Mark Muchow,** president of Chain O'Mines Co. Chicago, tells of important progress being made at the company's large mining and milling enterprise in Gilpin County. He says: "Our pumps are sending water to our new 4,000 ton mill. We expect to handle complex ore and will recover lead, zinc and copper soon and of course, gold and silver. Central City needs a low cost operating mill. No one can operate even on 500 tons daily on low grade ores. Our mill will reach a daily capacity near the 10,000 ton mark, because we have six large 8-ft. ball mills to be tied into one circuit."

● **Sprague & Henwood Inc.,** diamond drilling contractors and manufacturers of Scranton, Pa., announce the opening of a new branch in Grand Junction. Robert R. Carver is manager of the new office.

ILLINOIS

● **Outlook for the fluorspar industry** in the Ill.-Ky. mining district is darker at present than at any time in its entire history. Operators are outspoken in the belief that extensive importation of cheaply produced Mexican spar spells ruin for the domestic industry in the mid-west market if the present trend continues. The Ill.-Ky. area supplies 78% of domestic production.

Possible shutdown of the mines looms in the picture with suspension of operation and lay-offs already reported in several instances.

One major producer described the situation as "groggy" while another called it "a sorry outlook" with unanimous agreement among all operators that Mexican imports are taking over the mid-west market and the future is highly precarious.

Operation has been suspended by Aluminum Co. of America, Fluorspar Division, at its Klondike mine in the Kentucky field, pending clarification of the market outlook, and Victory Fluorspar Co., in the Illinois district, has shut down temporarily while lay-offs are reported from other plants.

Producers have filed a petition for hearing before the U. S. Tariff Commission on an increased tariff rate and establishment of import quotas. The present rate on Mexican imports is $7.50 per short ton on metallurgical and $1.87 per short ton on acid grade.

WORM GEARING—Universal in its application—affords advantages for almost every power transmission job. Select worm gear units to meet your need from the complete Cleveland line.

Photo courtesy Engineering and Mining Journal.

Easy picking on CLEVELAND-driven table

"Scalping off" lumps of impure metallic ore from this picking table is easier and more efficient because the belt moves evenly and without delays. It is kept running uniformly day in day out, year after year, by a Cleveland worm gear speed reducer.

Clevelands—designed for peak loads and top speeds—perform with sure, steady, even movement above or below ground, in all kinds of weather, under all operating conditions For over a quarter century, Clevelands have faithfully served the mining industry—driving shuttle cars, picking tables, conveyors, hoists and other equipment on which a right-angle drive is needed.

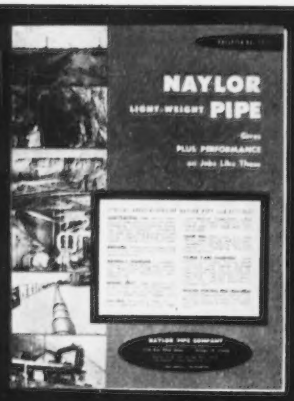
Clevelands are compact and powerful, have a minimum of moving parts, consequently, a greater freedom from repairs. If your plans call for a foolproof, trouble-free right-angle drive, investigate Cleveland. Write for new Catalog 400. The Cleveland Worm & Gear Company, 3281 East 80th St., Cleveland 4, Ohio.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers Limited.

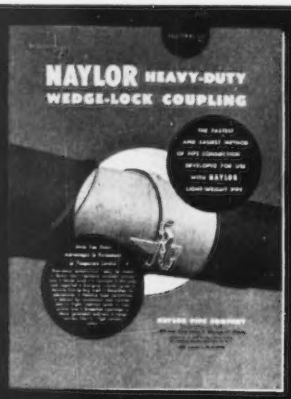
CLEVELAND
Worm Gear
Speed Reducers

SHORT COURSE ON PIPING

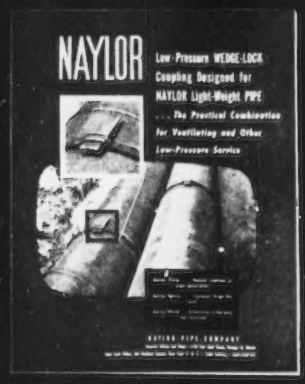
These four bulletins make up a handy reference library on light-weight pipe, connections and fittings and their applications in your field.



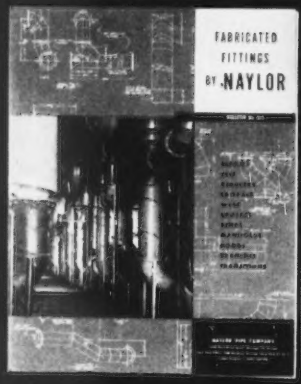
Bulletin No. 507 covers the applications and specifications of Naylor light-weight pipe and fittings.



Bulletin No. 513 presents data on Naylor heavy-duty Wedge-Lock couplings for permanent or temporary service.



Bulletin No. 514 offers information on Naylor low-pressure Wedge-Lock couplings for vent pipe.



Bulletin No. 525 deals with Naylor fabricated fittings for both standard and special requirements.

Copies of these bulletins are available on request.

NAYLOR PIPE COMPANY
1243 East 92nd Street, Chicago 19, Illinois
New York Office: 350 Madison Avenue, New York 17, New York

Illinois *(Continued)*

Tentative plans are being made for organization of a Fluorspar Producers' Association for consolidated effort toward solution of the problem.

Low mining costs, low labor costs, and the enormous available supply in the Mexican production areas constitute the direct threat to domestic competition. Cost to Mexican producers of mining, hauling, re-cleaning, and loading on freight cars, plus export duty and freight charge, totals 104 pesos, or $12, per long ton.

The purchase price at the border for acid lump, duty paid, is $28 per ton. Metallurgical grade of 70 effective units is $13 and 60 effective units, $11 per ton, middle of the bridge and no U. S. duty paid. At present Mexican producers are not shipping ore of 60 effective units, but only the higher grades, an industry spokesman said.

Total foreign fluorspar imports from all sources in July were 43,000 tons. If that figure is maintained, total for the year will be 516,000 tons while total consumption is estimated at 600,000 tons. European imports to the eastern seaboard reach the eastern markets.

Some consumer companies are purchasing fluorspar properties in the Mexican production area.

Decline of the fluorspar industry in the Ill.-Ky. region would have severe economic repercussions in the communities it now serves.

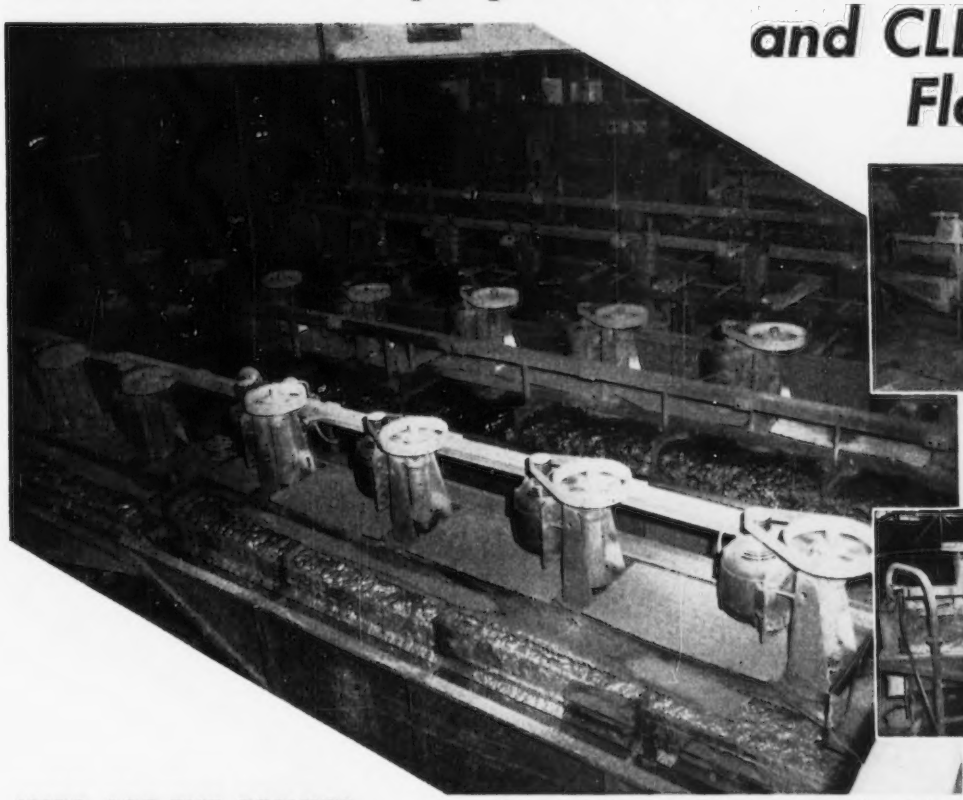
IDAHO

● **Sunshine Mining Co.'s** south exploration crosscut from the No. 4 shaft on the 3400-ft. level has penetrated the Yankee Girl vein in Metropolitan Mines Corp. ground exposing a two-foot width of siderite gangue with tetrahedrite ore assaying about 10 oz. of silver per ton. A west drift is now in progress along the vein to get under the No. 87 stope which yielded high-grade ore above the 3100-ft. level. This objective lies about 300 ft. west of the point where the crosscut intersected the vein.

● **Benefits sought** by Sunshine Mining Co. in revising metallurgical procedures at its big concentrator plant on Big Creek between Wallace and Kellogg have been achieved, company officials revealed recently. Changes in the flotation circuit and reactivation of the antimony leaching plant have enabled the company to produce concentrate products more readily acceptable at smelting plants and at the same time to start production of a new by-product—granular cathode antimony — at the rate of about 90,000 lb. a month.

When the program to revise and improve metallurgy was started late last year, the company was producing a bulk lead-silver-copper concentrate containing a relatively high antimony

FAGERGRENS *pay off in both ROUGHER and CLEANER Flotation*



Fagergren cells in lead cleaner flotation circuit.

Fagergren cells in zinc cleaner flotation circuit.

Fagergrens used for rougher flotation by Pend Oreille Mines & Metals Co., Metalline Falls, Wash. Zinc circuit in foreground, lead circuit in center; duplicate circuits being installed in background.

HERE ARE THE RESULTS OBTAINED BY A MAJOR LEAD-ZINC PRODUCER

48 Fagergren Flotation Machines are used by Pend Oreille Mines & Metals Co. in flotation circuits having a capacity of 1600 tons per day. The ore is hard and abrasive with lead (as galena) occurring in coarse crystals and zinc (as sphalerite) finely disseminated in the gangue. Specific gravity of ore is 2.7 to 2.8.

Fagergren's highly efficient performance in this application produces superior metallurgical results, as follows:

1. Lead concentrate grade averaging well over 70% lead.
2. Zinc concentrate grade running close to 60% zinc.
3. Recoveries of approximately 95% lead and zinc in respective concentrates.
4. Exceptionally low lead and zinc tailing assays.

High Metallurgical Efficiency, as demonstrated above, is not unusual with Fagergrens. It is based on the faster rate of flotation and greater flotation recovery made possible by Fagergren's exclusive Rotor-Stator design. This superior agitating mechanism is unmatched for effective pulp circulation and aeration with resulting greater capacity per cubic foot of cell volume and higher mineral recovery.

Specify Fagergrens for your next installation or as replacements for older, less efficient machines. Send today for free copy of Fagergren descriptive bulletin and for recommendations concerning your flotation problem.

PRINCIPAL OFFICES
San Francisco • Sacramento
Salt Lake City • Spokane
Denver • Phoenix
Chicago • Hibbing, Minnesota
New York • Birmingham
Toronto, Canada
Jeffersonville, Indiana

EXPORT DISTRIBUTORS
Fraser & Chalmers (S.A.) (Pty.) Limited
P. O. Box 619, Johannesburg, South Africa
Lilestone & Co., Inc.
P. O. Box 3368, Manila, Philippines
United Development Corporation Pty. Ltd.
P. O. Box 3460, Sydney, N.S.W., Australia
Corporation Commercial Sudamericana S.A.
Casilla 505, Lima, Peru

WEMCO®
WESTERN MACHINERY COMPANY
760-766 FOLSOM STREET · SAN FRANCISCO 7, CALIFORNIA

Mobil Mills • Coal Spirals • HMS Thickeners • HMS Pumps • Sand Pumps • Agitators Cone Separators • Drum Separators • Hydroseparators • Fagergren Laboratory Units Fagergren & Steffensen Flotation Machines • S-H Classifiers • Attrition Machines HMS Laboratory Units • Dewatering Spirals • Thickeners • Conditioners • Densifiers

RUGGED and TOUGH

...of course... they're built by HEIL

12-yd. Heil Rock Body and Twin Telescopic Hoist used in open pit iron mine hauling.

Heil 15-yd. H-60 Rock Body with 70° double-acting hoist in operation on the Mesabi. Heater arrangement in floor utilizes heat of exhaust to prevent ore freezing to body.

15-yd. Heil H-60 Rock Body with telescopic hoists. Heil bodies can be individually engineered to your requirements for body length and load distribution.

RUGGED, rock-ready construction . . . that's just one of the Heil Rock Body features that hits the bull's eye every time for profitable operation on the toughest jobs. Heil Rock Bodies are fabricated of ¼" (or heavier) steel plate, with box-member ribs providing rigid reinforcing for maximum strength. Floor has a 2" hardwood cushion sandwiched between body bottom and wearing plate to absorb the shock of loading with big buckets. Subframe construction with both cross members and long members interlocked and welded into a single assembly prevents sagging of the body floor.

Heil hoists are fast-acting, simple and trouble-free . . . designed for heavy-duty service.

Remember, when your dump body is Heil-built, it's well-built! It stays on the job and out of the shop. It withstands the daily punishment of heavy loads . . . and comes back for more, year after year. Your Heil distributor can give you the facts about *all* Heil features. See him today!

THE HEIL CO.

DEPT. 75123, 3075 WEST MONTANA STREET, MILWAUKEE 1, WISCONSIN
Factories: Milwaukee, Wis. — Hillside, N. J.

Sales Offices: New York, Union, N. J., Washington, D. C., Atlanta, Cleveland, Milwaukee, Detroit, Chicago, Kansas City, Denver, Dallas, Los Angeles, Seattle; Rio de Janeiro, Brazil.

BH-8

HEILINER 13 AND 18-CU. YD. SCRAPERS

HEILINER 20-CU. YD. BOTTOM DUMP WAGON

CABLE POWER CONTROL UNITS

Idaho *(Continued)*

content which was difficult to market at either a lead or copper smelter.

Under the program, flotation circuits were changed to produce two concentrate products—one a high-grade tetrahedrite (silver-copper) which contains 65 to 70% of the company's silver output and the other lead-iron concentrates which contains 85 to 90% of its lead production.

The antimony leaching plant, built during World War II and closed down in January 1944, was then put back into operation so that the antimony could be leached out of the tetrahedrite product, leaving a copper residue suitable for a copper smelter.

The company is now realizing a better return on the silver in the leached concentrate and is stockpiling the antimony output pending completion of arrangements for marketing. The granular antimony is 96% pure and must be further refined to qualify as Star Brand antimony, but it is suitable for converting to antimony oxide without refining.

● **A new easterly** exploration drift on the 1800-ft. level at Golconda Lead Mines operation east of Wallace has encountered two short segments of good zinc ore in an area where no ore was expected. One of the ore zones is about 50 ft. long and the other 35 to 40 ft. long. They are separated by a comparatively barren area. Samples taken across the width of the ore assayed as high as 30% zinc, but drift-width muck which was stockpiled ran about 5% zinc and 0.7% lead, with a small amount of silver.

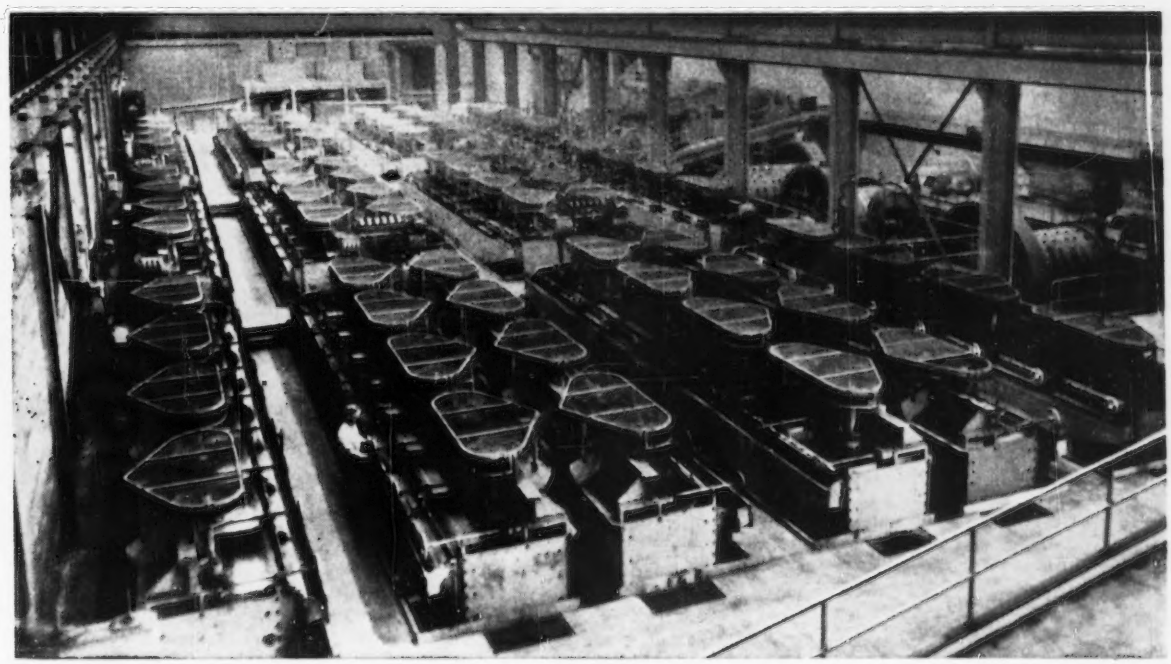
Old workings on the 1600-ft. level are now being reopened to determine whether any indications of this new ore were ever exposed on that horizon.

Main objective of the 1800-level drift is the downward extension of a rich lead-silver ore shoot which has been mined from the main adit level (the 1000) and the 1150-ft. winze level. About 800 ft. of drift remains to be driven to reach the estimated position of this objective. The work is being done under a $90,000 contract with the Defense Minerals Exploration Administration.

● **Kennecott Copper Corp.'s** exploration subsidiary, Bear Creek Mining Co. of Washington, is investigating potentialities of two old mining properties in West Central Idaho—the IXL copper prospect in the Seven Devils area of Adams county and the four-claim Duerden zinc property in the Marshall Lake District of Idaho County, near Burgdorf. Preliminary option agreements have been concluded with the owners of the properties, and a substantial amount of diamond drilling has been completed on the Duerden claims, according to Lowell B. Moon, geologist in charge of the exploration office. Work on the IXL to date has been largely surveying and mapping of geology. It is a

CUT FLOTATION COSTS WITH DOW XANTHATES

Superior collectors increase profits by providing greater recovery, higher concentrate grade of sulfides



With Xanthates on the job every bubble is loaded to capacity, increasing your recovery and raising your concentrate grade. Because of their greater efficiency in fast, complete separation of the sulfide minerals, Dow Xanthates save you money.

For more efficient differential flotation, Dow offers a wide range of Xanthates of extremely selective collector power. Since all of these collectors are essentially nonfrothing, the operator enjoys complete freedom to regulate frother and collector independently.

Dow also produces Dowfroth* 250, a quality frothing agent giving improved metallurgy with lower frother consumption.

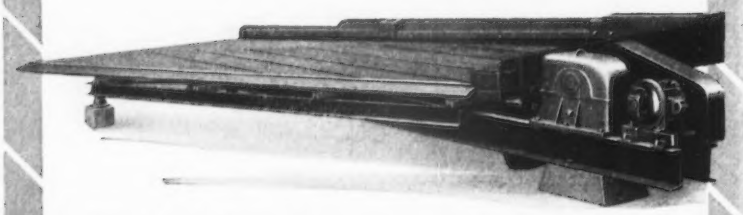
Learn more about these quality flotation agents, Dow Xanthates and Dowfroth 250. For further information and test samples, write to THE DOW CHEMICAL COMPANY, Midland, Michigan, *Dept. OC 3-41B.*

*TRADEMARK

you can depend on DOW CHEMICALS

DOW

SuperDuty Tables Reduce Cost of High Grade Concentrates



Winning high grade concentrates is only one phase of concentrating economics.

But the operator who employs SuperDuty Diagonal Deck Concentrating Tables gets such concentrates with optimum recovery at high feed rates—with exceptionally low cost.

To gain this composite of advantages, SuperDuty tables combine the inherent advantage of the diagonal deck design with a highly effective and smooth running head motion, and factory aligned underconstruction.

Proof of SuperDuty performance and acceptance is found in the increasing numbers of these profitable tables that are seen in concentrating plants across the continent.

For full details ask for Bulletin 118B.

CONCENCO FEED DISTRIBUTOR

The Concenco Revolving Feed Distributor is a heavily fabricated all steel machine with motor drive requiring 1 H.P. or less in operation. It effectively provides a splitting of feed into any desired number of equal portions, feeding any number of circuits or machines in battery for greater overall efficiency. Unexcelled for concentrating tables.

THE DEISTER ★ CONCENTRATOR COMPANY

903 Glasgow Ave. • Fort Wayne, Ind., U.S.A.

CONCENCO PRODUCTS

★ *The ORIGINAL Deister Company* ★ *Inc. 1906*

Idaho *(Continued)*

47-claim group and is believed to be a good prospect for deep development.

● **Idaho Goldfields Inc.** has opened oxidized lead ore of "bonanza" grade in a shallow winze at its property in Fourth of July Canyon between Kellogg and Coeur d'Alene, W. M. Fredericks of Spokane, a director of the company, reports. Samples from large chunks of ore heavily encrusted with crystallized lead have assayed as high as 78.2% lead and 63.3 oz. of silver per ton. The winze, which is being sunk on a vein near the portal of the adit tunnel, encountered the rich ore at a depth of about 20 ft. below the tunnel floor. Previous diamond drilling had disclosed encouraging values at depths ranging from 150 to 300 ft.

● **Recent exploration work** at the old Ophir gold property in the Bear Creek District of Elmore County, near Rocky Bar, by Western Consolidated Mines Inc. has exposed good gold and silver values over a five-foot width in a previously unexplored section of the Ophir vein, according to Gene Jack, Boise, president and general manager. A new tunnel opened the structure about 165 ft. from the portal and further development is underway. Ophir mine is reported to have produced over $2-million worth of gold and silver when operated by Consolidated Mining Co. of New York in the late 1880's.

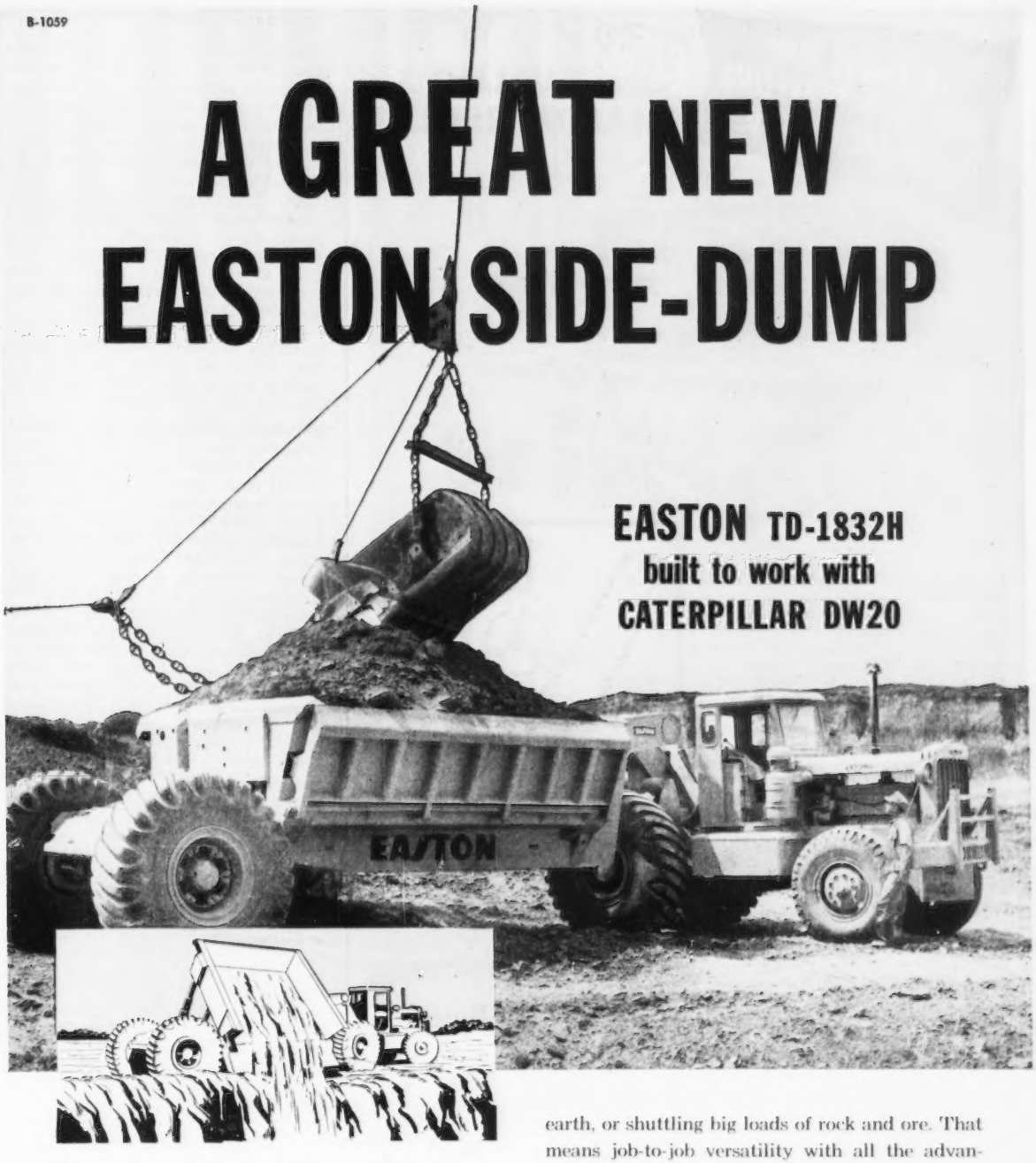
● **Directors of** Sunset Minerals Inc. have proposed voluntary sale, lease or exchange of the company's assets to a new corporation as a solution to financial problems which the company is facing because of the continued low prices of lead and zinc. Articles of incorporation for a new firm, Sunset Mines Inc., were filed recently with the Idaho Secretary of State, listing capitalization of $400,000. Directors of Sunset Minerals are the incorporators.

● **Clearwater Mines Inc.** has reopened its 18-claim property on Niagara Creek in southeastern Shoshone County and has started production from a new vein about 700 ft. from the portal of the 1200-ft. main adit tunnel. Copper ore with silver and gold values is being trucked to the Nancy Lee Mines' mill near Superior, Mont., for processing. Since starting work last June the company has cleared out and retimbered two tunnels, unwatered the shaft to below the 100 level, rehabilitated mine buildings, and installed complete equipment for a mining operation. Drift work on the 100 level is reported to have exposed a good grade of ore. Leon Saboe, president and manager of the company, is directing the work.

● **Inspiration Lead Co. Inc.** of Wallace has organized Inspiration Lead Co. of Montana as a wholly-owned subsidiary to take over operation of the 12-claim Oro property in the Yaak

B-1059

A GREAT NEW EASTON SIDE-DUMP



EASTON TD-1832H
built to work with
CATERPILLAR DW20

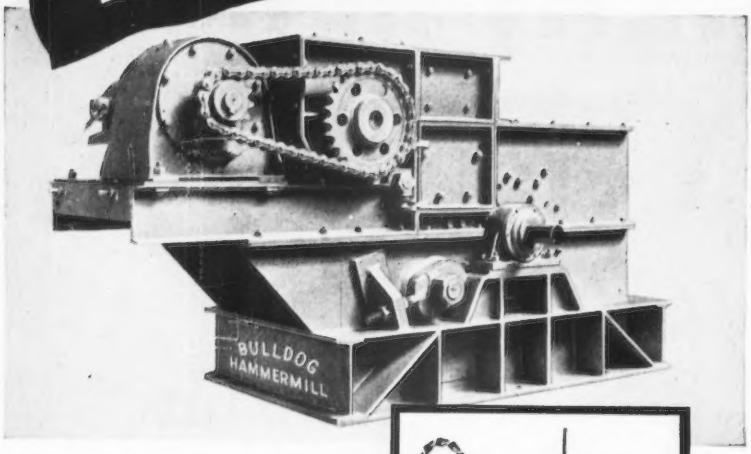
Here is the trailer that will change the whole picture of side-dump hauling in off-highway service. It's Easton's most versatile big side-dump . . . job-proved and ready for rugged all 'round service in earthmoving, mining and quarrying. Big single tires, low center of gravity, and outboard-mounted hydraulic jacks assure remarkable lateral stability even while dumping on the run. The big new TD is equally at home windrowing a 32-ton load of earth, or shuttling big loads of rock and ore. That means job-to-job versatility with all the advantages of side-dumping! Every feature of the Easton body, axle, and automatic door has been proved for dependability in the most rugged type of earth and rock handling service. Now available in 24 and 32 ton capacities. See your local Caterpillar Dealer for complete information.

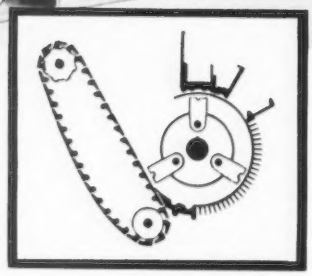
Easton Car & Construction Company • Easton, Pa.

EASTON®

EXCLUSIVE NEW NON-CLOG TRAVELING BREAKER PLATE

BULLDOG HAMMERMILLS





Exclusive NON-CLOG MOVING BREAKER PLATE moves wet, sticky materials rapidly through the Bulldog Hammermill without slow-downs. This gives twice the capacity of others! Bulldog *manganese steel* hammers last 15 times longer. Get full details today about how you can double production, cut costs with the Bulldog Hammermill. Ask about other models, too!

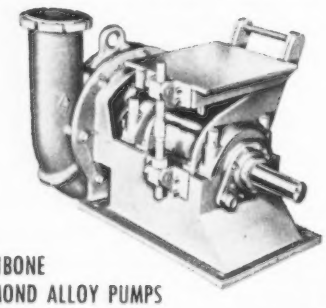
HAMMERMILLS, INC.

WRITE FOR BULLETIN 533

4700 West Division Street
Chicago 51, Ill. • SPaulding 2-9300

Subsidiary of PETTIBONE MULLIKEN CORP.

Lowest Maintenance Cost of Any Pump
FOR ORES AND SOLIDS



PETTIBONE
DIAMOND ALLOY PUMPS

No mine pump equals PETTIBONE DIAMOND ALLOY PUMPS for resistance to abrasion, for only Pettibone uses Diamond Alloy Steel. Exclusive overhead motor-mount with V belt drive conserves space, makes speed adjustments simple.

Ask for Bulletin 353.

HYDRAULIC DIVISION

4700 West Division Street
Chicago 51, Illinois SPaulding 7-9300

PETTIBONE MULLIKEN CORP.

Idaho *(Continued)*

Mining District of Lincoln County, Mont., under a profit-sharing agreement. An option which the company acquired about three months ago has been taken up and a program of exploration and development has been started under the direction of R. R. Weideman, Inspiration mine manager. Preliminary prospecting and exploration work under the option exposed three promising ore shoots containing lead, silver, copper and gold at the surface along a vein structure which was followed for about 900 ft. on the property.

An access road to the main surface workings has been completed, necessary initial equipment has been installed, and a new lower tunnel on the vein has been started.

● **Polaris Mining Co.** has started breaking new ground on the projected 10,000-ft. easterly exploration lateral from the 3,000-ft. level of its Silver Summit Mine in the silver belt of the Coeur d'Alene District into the adjoining properties of Merger Mines Corp., American Silver Mining Co., Silver Standard Mining Co., and Rainbow Mining and Milling Co. The project, which is being done under a $685,955 Defense Minerals Exploration contract, was started late in August and several weeks work were required to install track, water and air lines in a 500-ft. drift driven several years ago into Merger ground. The venture is a profit-sharing deal which Polaris has undertaken to finance, with DMEA aid, in return for a substantial interest in any ore that may be developed in the course of the work. Other participating companies are Coeur d'Alene Mines Corp., Callahan Consolidated Mines, and Coeur d'Alene Consolidated Silver-Lead Mines.

● **Gibbonsville Mining & Exploration Co.** has suspended operations at its tailings recovery mill on the river flats west of Kellogg until next spring in order to allow the company time to raise additional capital for the venture. The mill, which was built with the aid of a $77,000 loan from the Reconstruction Finance Corp. to recover lead, zinc and silver values in tailings which have settled in the bottom of the South Fork of the Coeur d'Alene River, was put into operation last spring and by July was on a profitable basis. Profits, however, were insufficient to offset losses during the first months.

● **Bunker Hill** and Sullivan Mining and Concentrating Co. has begun full operation of the new charge preparation plant which it has installed at its lead smelter in Kellogg at a cost of about $3-million. Construction, by Stearns-Roger Manufacturing Co. of Denver, under contract, was started late in 1951.

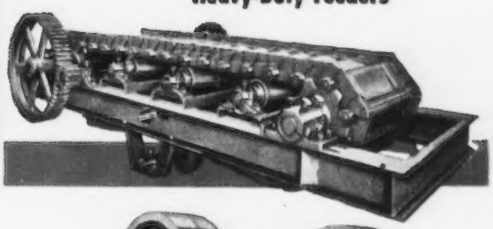
The entire plant, housed in three parallel structures covering an area about a block long by half a block

TELSMITH

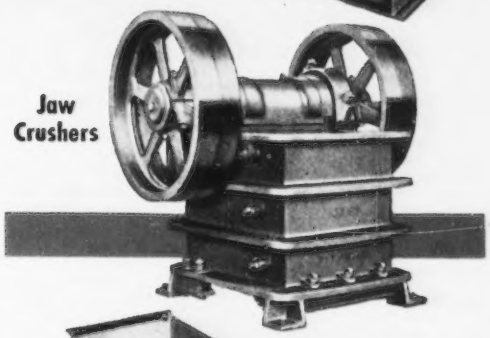
feeding
coarse crushing
screening
fine crushing

EQUIPMENT FOR MINES

Heavy-Duty Feeders

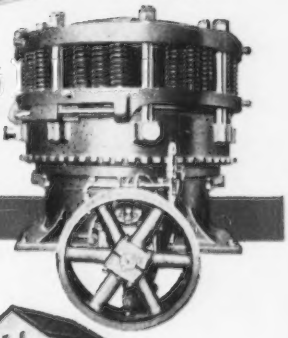


Jaw Crushers

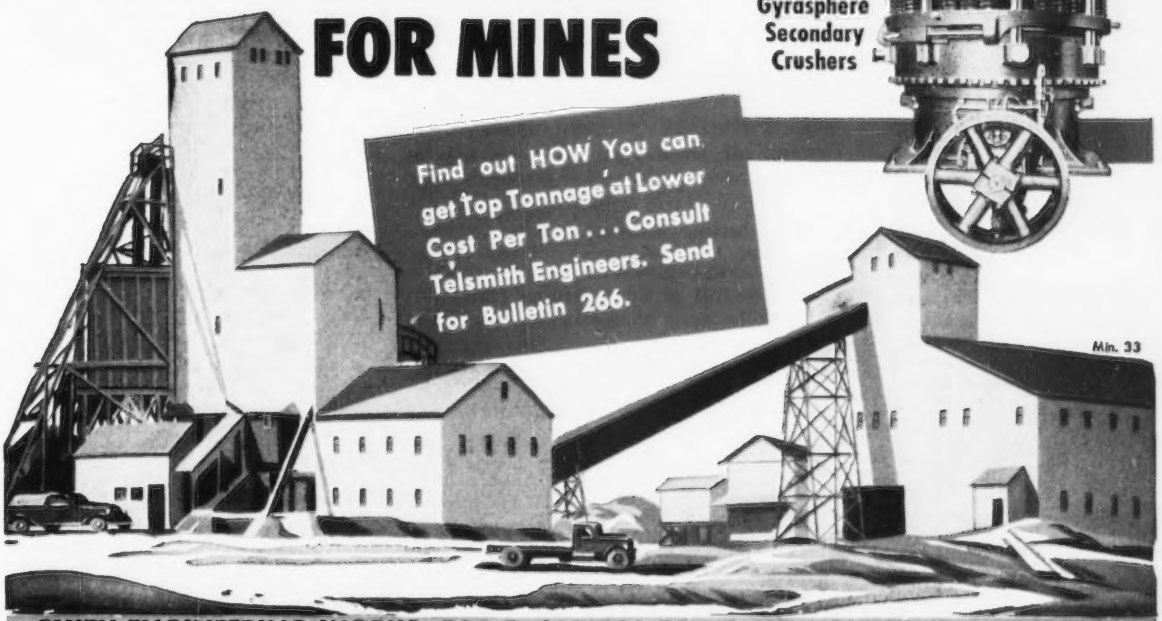


Vibrating Screens

Gyrasphere Secondary Crushers



Find out HOW You can get Top Tonnage at Lower Cost Per Ton . . . Consult Telsmith Engineers. Send for Bulletin 266.



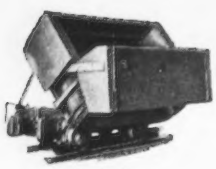
SMITH ENGINEERING WORKS, 502 E. CAPITOL DRIVE, MILWAUKEE 12, WISCONSIN

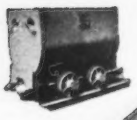
Cable Address: Sengworks, Milwaukee

Samuel Osborn (S. A.) Ltd., Johannesburg, So. Africa • 51 East 42nd St., New York 17, N. Y. • 211 W. Wacker Dr., Chicago 6, Ill.

W. B. Thompson Co. Iron Mountain, Mich. | Berry, Inc. Duluth 2, Minn. | Mine & Smelter Supply Co. Denver 17, Colo. | Fouiger Eqpt. Co. Salt Lake City 8, Utah | Mines Eng. & Eqpt. Co. San Francisco 4, Calif.

Robert S. Bailey, Los Angeles 17, Calif. • Ontario Eqpt. & Supply Ltd., Toronto, Canada • Gordon Russell, Ltd., Vancouver, B. C.


Granby-type Dump Cars

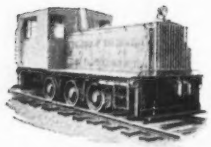

Mining Cars

Tray-type double Side Dump Cars

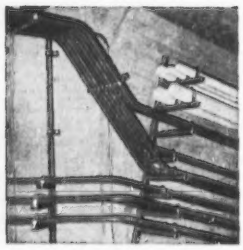
Cradle Dump Cars

Profit-making Performance to meet your *Particular* needs...

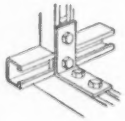
Industrial Trailers


Diesel Mechanical, Diesel Hydraulic, Diesel Electric, Alcohol and Gasoline Locomotives from 3 to 70 tons

in all Pressed Steel Car Company Equipment!



Unistrut metal framing can be used as a support for power cables, as shown, and for practically every rack and shelving installation. Unistrut requires no hole drilling, no welding—is 100% adjustable and is 100% re-usable.



MINE OPERATORS all over the world have profited by following a simple bit of advice. When buying, get equipment capable of performing **all that you will ever ask of it!** Don't be swayed by other considerations. Remember—no two mines have exactly the same production and cost problems.

Whether it be a locomotive, mine car, trackwork, Unistrut or other mining equipment you can be sure of completely satisfying **your** needs and objectives when you buy from Pressed Steel Car Company.

For proof—just provide us with an outline of your particular requirements . . . see how our Engineering and Research Department can suggest ways and means to effectively satisfy your equipment needs.

Steelcar

Address Dept. WX

PRESSED STEEL CAR COMPANY, INC.

Export Division

25 Broad St., New York 4, N. Y.

Idaho *(Continued)*

wide, includes a crushing and grinding unit, a proportioning unit and a pelletizing plant. Its purpose is to provide more accurate control in blending the various materials in the feed or "charge" for the roasting machines and to prepare the charge in nodulized form in order to increase the efficiency of the roasters. It is expected to almost double the capacity of the present roasting equipment by reducing to a minimum the amount of double roasting required.

MICHIGAN

● **M. A. Hanna Co.** has installed a 60,000 cu. fpm. blower fan at its Hiawatha Mine at Iron River. This is the second fan for ventilation at this mine. In addition to these, the company operates an 80,000 cu. fpm. fan at the Homer Mine and a 60,000 unit at the Wauseca.

● **Ralph S. Archibald,** president of North Range Mining Co., has announced that the company will construct a heavy density concentration plant at its Book Mine at Alpha during this winter. The plant is expected to be ready for operation next spring. Archibald states that the only other heavy density plant at the Michigan iron ore mine is located at the Cleveland-Cliffs Iron Co.'s Ohio Mine on the Marquette Range.

● **Longest train** ever moved in the Iron River district was handled in October when 300 empty ore cars were delivered to the Stambaugh yards by a four-unit diesel locomotive. Normal load of empties does not exceed 150 cars, but the unusual drag was brought in without help from other locomotives.

MINNESOTA

● **Sylvia-Dee Mining Co.,** D. D. Haley, president, has begun shipping ore from its Michael open pit mine near Buhl. The property, a state lease, was opened up this year.

● **Haley-Lavollo Mining Co.,** a new firm, will open an open pit mine on two forties near Buhl which are known as the Jennings tract.

● **After shipping** about 125,000 tons of ore, the Elbern Mine of the Haley-Young Mining Co. has concluded production for the season. The company is also operating the Ernie Mine, a state lease, in Wuori Township, north of Virginia, with the ore being handled by the heavy media plant of Skubic Brothers.

● **E. A. Young Inc.,** has shipped over 100,000 tons of ore in 1953 from the state leased Minnewas mine at Virginia, by both underground and open pit methods. Minnewas was operated

PUMPS for MINING

FLUID POWER PUMPS

Hydraulic drives for winches, conveyors and ventilating fans . . . drives and controls for mine locomotives, shuttle cars, trammers, timbering and roof drilling machines. Hydraulic control of cutters, gathering arms and loading heads of continuous miners . . . . directional control and positioning of auger drills. Hydraulic drives and controls for preparation plants. Hydraulic controls for shovels, dump trucks and other types of earth-moving equipment.

LIQUID HANDLING PUMPS

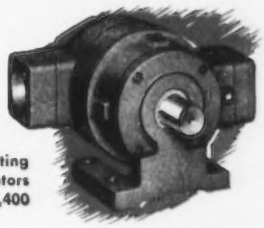
An exceptionally broad range of types, sizes and special constructions to handle liquids for wet grinding mills, washing, flotation and hydraulic classification units, slurries, tailings and sludges. Pumps for water supply, boiler feed, sump service, filtering and cooling towers.

VACUUM PUMPS

High vacuum pumps for laboratory, electronic, atomic research, chemical processing, vacuum refining of metals, dehydration, vacuum drying, refrigeration and de-aerating.

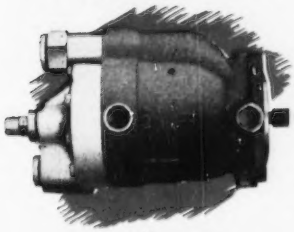
HYDRECO
GEAR TYPE PUMPS

Reversible and non-reversible. Gear type pumps in exclusive FOUR-BOLT design . . . capacities from .5 to 130 gpm and operating pressures to 1500 psi . . . flange or foot mounted . . . furnished with keyed shaft with spline shafts optional. Also dual and tandem models.



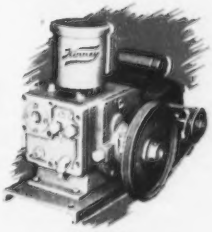
DUDCO
DUAL VANE TYPE PUMPS

DUDCO Pumps provide a broad range of sizes with capacities to 120 gpm and pressures to 2000 psi. Also available in dual units operating from a single drive. Hydraulic motors with starting torque outputs to 14,400 lb. in.



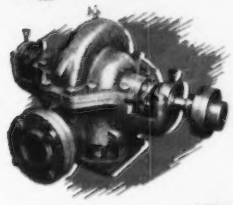
STRATOPOWER
PISTON TYPE PUMPS

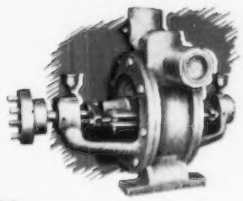
Axial reciprocating piston type . . . constant or variable delivery with capacities of .25 to 10 gpm at nominal speeds of 1500 rpm with maximum of 4500 rpm . . . working pressures to 3000 psi . . . direct engine and individual electric motor driven models.



KINNEY
VACUUM PUMPS

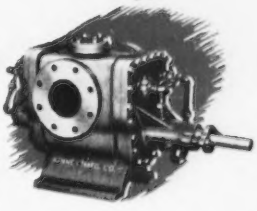
Single stage models to produce absolute pressure readings of 10 microns (.01 mm Hg.) . . . compound pumps producing readings of .2 microns (.0002 mm Hg.) or better. These Kinney High Vacuum Pumps are available in sizes for laboratory as well as high production use.





AURORA
CENTRIFUGAL & TURBINE PUMPS

Deep well, sump, drainage and condensation return units, household water systems. Industrial low and high pressure liquid handling pumps. Direct motor and countershaft driven horizontal and vertical models. Capacities 3 to 7500 gpm.



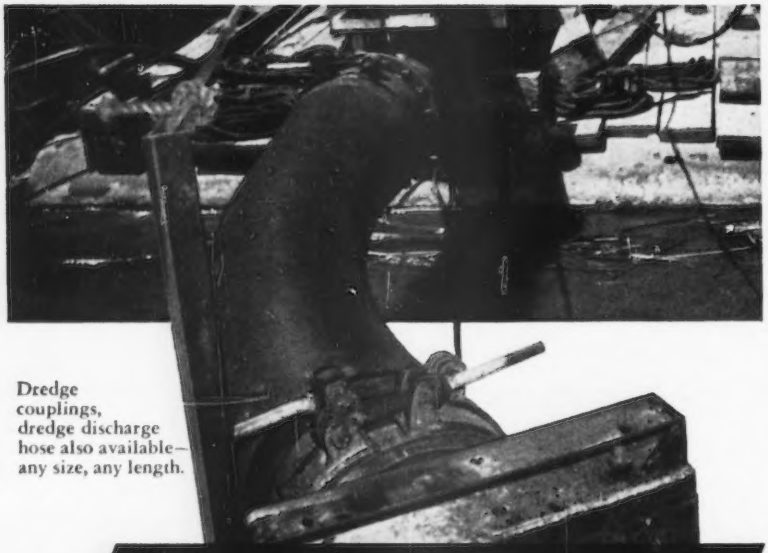
KINNEY
LIQUID HANDLING PUMPS

A complete range of sizes in Rotating Plunger and Herringbone Gear Pumps to handle light or heavy liquids . . . water, sludges, slurries and tailings. Available in plain or steam jacketed models.

THE NEW YORK AIR BRAKE COMPANY
230 PARK AVENUE • NEW YORK 17, N. Y.

THE NEW YORK AIR BRAKE COMPANY
230 Park Ave., Dept. EM, New York 17, N. Y.
Gentlemen: Kindly send me additional information on:
Hydraulic Pumps ☐ 1000 psi ☐ 2000 psi ☐ 3000 psi Liquid Handling Pumps ☐ Vacuum Pumps ☐

Name .....
Address .....
City ..... State .....



Dredge couplings, dredge discharge hose also available—any size, any length.

Cut costs and up production

WITH AMERICAN heavy-duty hose and belting

AMERICAN air drill hose has heat and oil resistant tube, extra-tough cover to withstand snagging and abrasion.

1. **Tailored To Your Job, At No Extra Cost.** At AMERICAN, each job is treated on an individual basis. You avoid costly "misfits"... get the hose or belt that meets your specific requirements. The result? — improved performance, added service life; *more* for your dollar.

2. **Fast Action.** The whole "works"—management, sales, engineering, laboratory, production—is under one roof. You deal with top management, get action—fast.

AMERICAN ribbed center conveyor belt grips and holds both wet and dry, round or angular materials on steeper inclines than any other belt.

Save hours and dollars—call AMERICAN first on your hose and belting needs.

Other AMERICAN custom-built products for mines, dredges and quarries.

- Chute liners
- Elevator belts
- Fire hose
- Fume and ventilating hose
- Pulley lagging
- Gold recovery equipment
- Special molded goods—water stops, gate seals, expansion joints, etc.
- Hose of all types . . . and complete line of mechanical rubber goods.

THE American RUBBER MANUFACTURING CO. AR-25

Factory & General Offices:
1145 Park Avenue • Oakland 8, California • Phone OLympic 2-0800

BRANCHES
SEATTLE: Smith Tower, SEneca 1727
PORTLAND: Dekum Building, CApitol 1708
SAN FRANCISCO: 7 Front St., SUtter 1-6068
LOS ANGELES: 711 E. Gage Ave., ADams 1-9279
BOISE: 1116 No. 18th St., Phone 2612
ST. LOUIS: 843 So. Lindbergh Blvd., WYndown 2226

Minnesota *(Continued)*

by the Oliver Iron Mining Co. from 1908 to 1941. It was opened up in 1893 by the Biwabik Mountain Iron Co. Shipments from the Minnewas have amounted to about 12,700,000 tons, with an estimated 352,000 tons remaining.

● **Pickands, Mather & Co.'s** Embarrass Mine has installed two-way radio communication — "walkie talkies" — between electricians doing remote switching operations, trouble shooting or repair work. While the arrangement reduces delays, its primary purpose is the extra safety it provides in lessening the hazards of long distance signalling by substituting direct conversation between men at different points on the job for less positive visual signals.

● **Construction work** on the new crusher and conveyor at the Mahnomen No. 1 pit is nearing completion. It was begun in early August by the Holmes Erection Co. Ore will be crushed in the pit and carried up a 1500 ft., 18 deg. slope conveyor to the present loading pocket on surface.

● **Ore carrier,** Ernest T. Weir, of the M. A. Hanna Co. fleet, took on a cargo of 21,057 tons on Sept. 10, setting a new record. Previous record was made in August 1952, when the Wilfred Sykes loaded 21,013 tons.

● **Carlz mine,** owned by Hanna Coal & Ore Corp. and operated by M. A. Hanna Co., consists of four forties. It is near Keewatin and is one of the newer properties operated by the company.

Stripping was begun in May 1951, with a 9W dragline. A 6½ cu. yd. shovel was added in September 1951, and a 7 cu. yd. in March 1952. As of Oct. 1, 1953, 5,886,783 cu. yds. of surface material and 33,163 yards of rock had been moved. Surface averages 130 ft. to top of ore. 76,845 tons of direct shipping ore was shipped in 1952.

The washing plant, which began operating May 6, 1953, has a capacity of 900 tons per hour. The mine has some direct shipping ore, straight wash and heavy-media ores. By Oct. 1, 1953, total shipments had reached 767,659 tons, which indicates that the Carlz may become one of the Mesabi range's large producers.

● **Mining operations** at the Patrick A and Douglas mines of the M. A. Hanna Co. closed Sept. 30, and the Galbraith stock-pile completed loading Sept. 10. At the Morton mine work has been started on the erection of the ore hoist. Stripping at the Morton has removed the last section of the reinforced concrete shaft which was sunk to ledge under compressed air about 45 years ago. Converting the Morton underground mine to an open pit operation involves removing 30-million cu. yds. of stripping and is one of the most difficult stripping jobs ever undertaken on the

IDEAS at work...cutting costs!

P&H Electric Shovels

Progress doesn't come by standing still! And many users of P&H Electric Shovels have learned (to their great benefit) of the strides made to cut costs in all kinds of open pit work.

How has P&H done it? Higher electrical efficiency results from equipment designed and built by P&H specifically for electric digging. Stepless power regulation gives smoother operation with none of the old contactor troubles. P&H Magnetorque* Hoist Drive gives you snappier dipper action—lasts the life of the machine. Air-filtered cab protects all electrical equipment. Independent propel permits faster move-ups. All-welded construction of rolled alloy steels provides the husky strength to withstand years of continuous shock loads.

These and many other advancements, still exclusive with P&H, mean steadier, faster digging. That, in the final analysis, means lower tonnage costs. If that's what you're looking for . . . P&H is your answer.

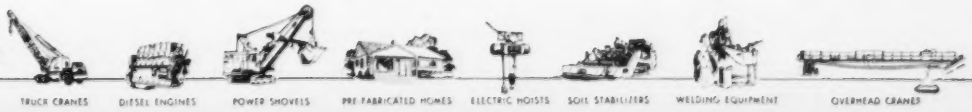
*T. M. of Harnischfeger Corporation for electro-magnetic type coupling.

P&H LARGE EXCAVATOR DIVISION

HARNISCHFEGER CORPORATION

MILWAUKEE 46, WISCONSIN

the P&H *Line*

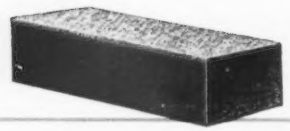


TRUCK CRANES · DIESEL ENGINES · POWER SHOVELS · PRE-FABRICATED HOMES · ELECTRIC HOISTS · SOIL STABILIZERS · WELDING EQUIPMENT · OVERHEAD CRANES

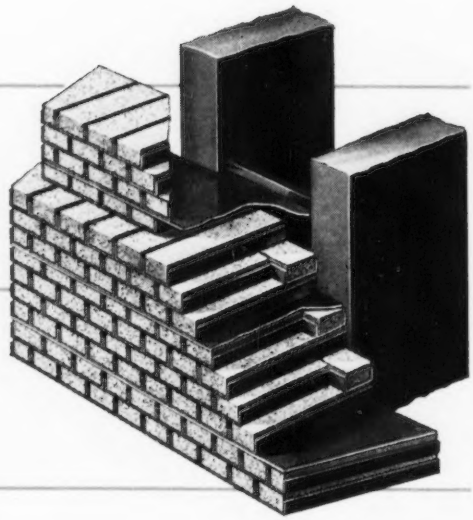
HARBISON-WALKER

CHROMEX B—an extremely hard fired chrome-magnesite refractory having unusual constancy of volume and strength at high temperatures.

METALKASE—the pioneer metal-encased basic brick possessing an unusual combination of desirable properties.



CHROMEX—a chemically-bonded chrome-magnesite brick having excellent spalling resistance.



Typical section of open-hearth furnace front wall built of METALKASE. For maximum stability steel plates are used at every fourth course vertically. These are tack-welded to steel bars which in turn are attached to the buckstays.

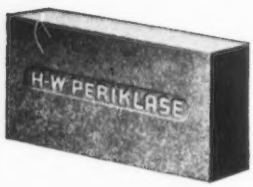
MAGNEX—a chemically-bonded magnesite-chrome brick—highly basic and of low spalling tendency.

H-W MAGNESITE—the standard burned magnesite refractory for more than half a century.

THERMAG—a hard burned magnesite-chrome refractory possessing enhanced physical properties.

H-W CHROME—a hard burned chrome brick especially adapted for various specific uses.

FORSTERITE—the only commercially produced magnesium-silicate brick—suited for certain particular applications.



H-W PERIKLASE—an exceptional high-magnesia brick of unusual high-temperature stability.

OTHER HARBISON-WALKER BASIC REFRACTORIES

H-W Magnamix
H-W Washington Dead Burned Magnesite Grains
H-W Washington Furnace Magnesite
H-W Special Furnace Chrome
Plastic Thermolith Batch
Thermolith and Other Cements

BASIC REFRACTORIES

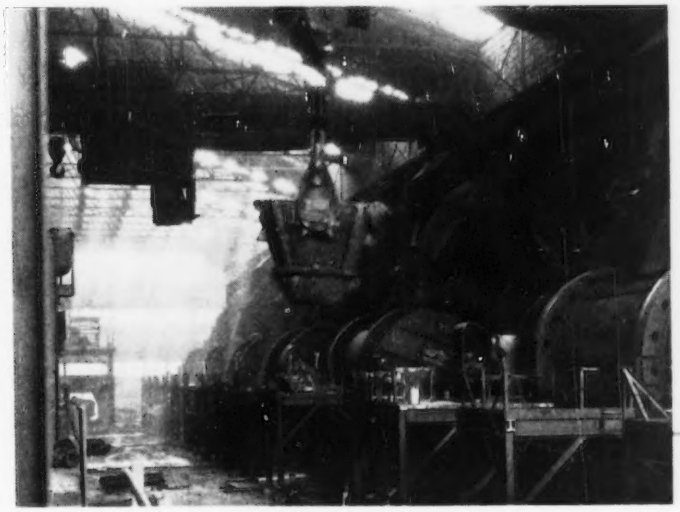
serve the varied and specialized needs for metallurgical furnaces

Shown at the left are the various brands of Harbison-Walker basic refractories. They include classes especially suited for each particular need in furnaces for smelting ores, refining metals and manufacturing alloys.

Among the brands listed here are types and classes established as standards for furnaces employed in the metallurgy of ferrous and non-ferrous metals and alloys.

The superior performance of Harbison-Walker basic refractories is the result of: (1) a thorough knowledge of the requirements gained through close cooperation with producers of metals and alloys; (2) extensive and continuous original research; and (3) the use of top quality raw materials processed in modern plants under close laboratory control. Harbison-Walker uses the most up-to-date methods and equipment to insure the quality and dependable uniformity of basic refractories.

(*Above*) In basic linings of electric furnaces, METALKASE are used in the upper side walls and provide maximum resistance to spalling and to slagging action. Lower side walls and subbottom are built of H-W MAGNESITE. MAGNAMIX or H-W DEAD BURNED MAGNESITE forms the monolithic banks and bottom.



Two popular brands of basic brick for copper converters are H-W MAGNESITE and CHROMEX B.

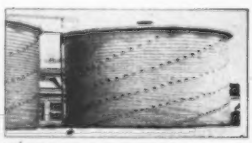
HARBISON-WALKER REFRACTORIES CO.

AND SUBSIDIARIES

World's Largest Producer of Refractories

GENERAL OFFICES • PITTSBURGH 22, PENNSYLVANIA

MOST ENGINEERS have long discovered the practicability of *wood* for many industrial installations. And each day, more engineers come to depend on SANTA FE, one of America's most complete facilities for the design and manufacture of industrial wood products. As specialists in wood engineering, SANTA FE can provide assistance on your most complex problem. Write today!



COOLING TOWERS • WOOD TANKS
WOOD PIPE • CROSS ARMS

AND OTHER ENGINEERED INDUSTRIAL WOOD PRODUCTS

SANTA FE TANK & TOWER CO.

5401 South Boyle Avenue, Los Angeles 58, California

BRANCH OFFICES IN ALL MAJOR CITIES

SINCE 1903

Minnesota *(Continued)*

Mesabi Range. The portion of the old shaft from ledge down is now being used for deep-well pumping. A 3500-gpm. vertical type, deep-well pump with a 400-hp. motor has been installed in the shaft.

● **Reserve Mining Co.** and the Minnesota Power & Light Co. officials have announced that the two companies have entered into an agreement under which each will supply surplus power to the other. Reserve Mining Co. is constructing a 40,000-kw power plant as part of the $160-million taconite processing program at East Beaver Bay. Minnesota Power & Light Co. will begin at once the construction of a new 110,000 volt, 75-mi. long transmission line between their steam plant in Duluth and Reserve's new station at East Beaver Bay which will include a 35,000 hp. sub-station near Reserve's station. The arrangement will permit Reserve to carry electric power over M. P. & Light's lines from its power station at East Beaver Bay to its mine crushing plant at Babbitt.

● **Minnesota State Executive Council** in a "precedent setting action" voted to allow the W. S. Moore Co. of Duluth; Pacific Isle Mining Co. of Hibbing and the Rhude & Fryberger Co. of Duluth to convert iron ore leases on five Mesabi and Cuyuna Range defunct iron mines to cheaper taconite leases.

The State Conservation Commissioner said the decision was "a momentous one" and considered the action as "encouraging the development of taconite processing in Minnesota."

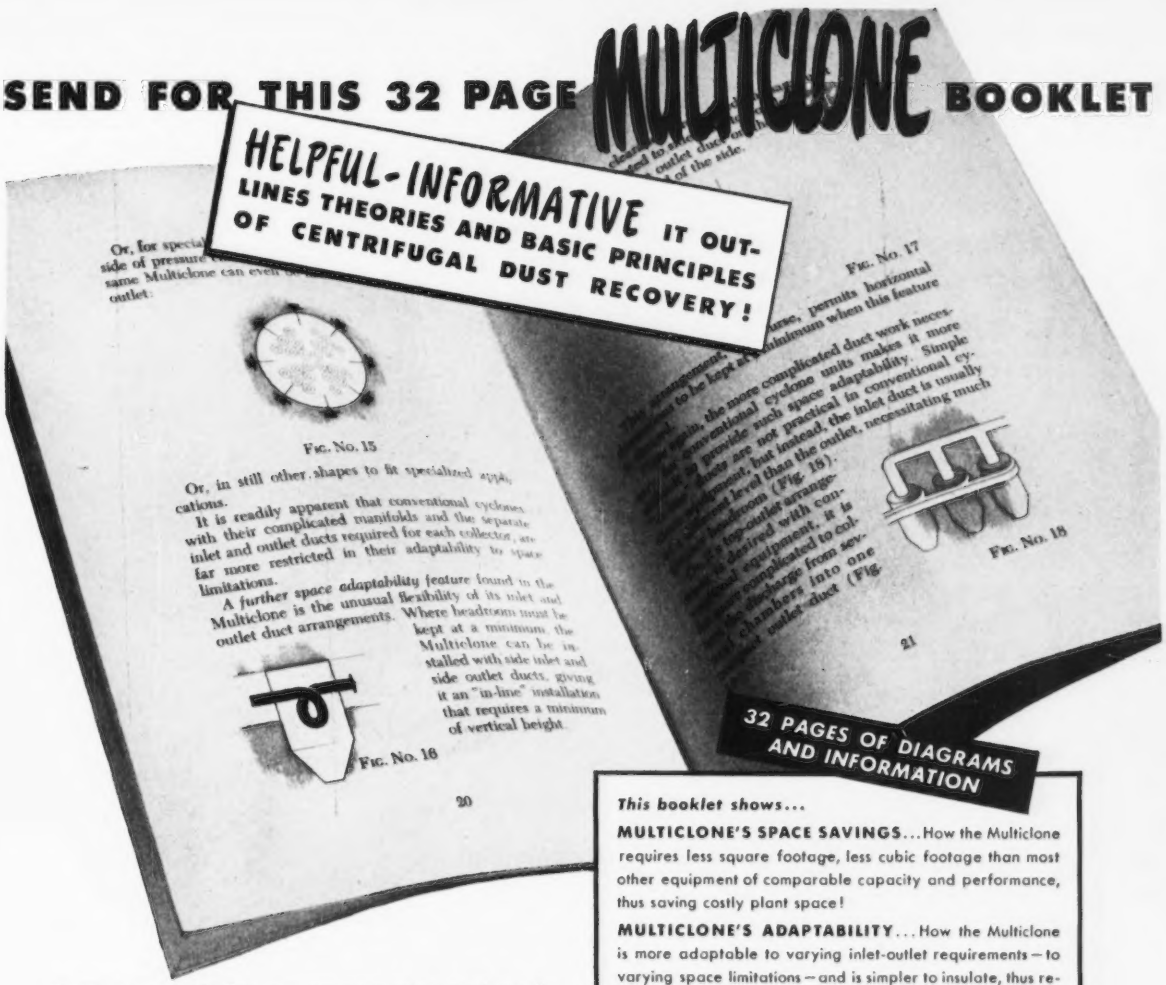
This is the first time the law, permitting this action, which was passed in 1947, has been invoked. Minimum rental on iron ore leases is $1,250 for the first year and $5,000 a year thereafter while on taconite leases the figures are $400 for the first five years and $1,600 per year thereafter.

● **Caland Ore Co., Inland Steel Co.'s** Canadian subsidiary, has announced that it has awarded a contract to Construction Aggregates Corp. of Chicago for dredging silt from its Steep Rock "C" ore body lease.

A. J. Cayia, vice-president and general manager of Caland Ore Co., estimates that the total consideration under the contract will be more than $25-million and that as much as 160 cu. yds. of material may be handled.

Since the ore body is deep, it will be mined by underground methods; but the water and silt must first be removed to insure a safe operation. Construction Aggregates Corp. has completed many large dredging jobs in the U.S. and has been working on a contract for Steep Rock Iron Mines Ltd. for several years. The Inland mine is scheduled to begin production in 1960 and, when fully developed, is expected to produce 3-million tons per year.

SEND FOR THIS 32 PAGE MULTICLONE BOOKLET


HELPFUL-INFORMATIVE IT OUTLINES THEORIES AND BASIC PRINCIPLES OF CENTRIFUGAL DUST RECOVERY!
FIG. No. 15
Or, in still other shapes to fit specialized applications.
It is readily apparent that conventional cyclones with their complicated manifolds and the separate inlet and outlet ducts required for each collector, are far more restricted in their adaptability to space limitations.
A further space adaptability feature found in the Multiclone is the unusual flexibility of its inlet and outlet duct arrangements. Where headroom must be kept at a minimum, the Multiclone can be installed with side inlet and side outlet ducts, giving it an "in-line" installation that requires a minimum of vertical height.
FIG. No. 16
20
FIG. No. 17
FIG. No. 18
21
32 PAGES OF DIAGRAMS AND INFORMATION

This booklet shows...

MULTICLONE'S SPACE SAVINGS... How the Multiclone requires less square footage, less cubic footage than most other equipment of comparable capacity and performance, thus saving costly plant space!

MULTICLONE'S ADAPTABILITY... How the Multiclone is more adaptable to varying inlet-outlet requirements—to varying space limitations—and is simpler to insulate, thus reducing installation costs!

MULTICLONE'S EFFICIENCY... How Multiclone's multiple *small diameter* tubes, made possible by its exclusive vane design, give higher centrifugal forces and more complete cleansing of *all* suspended particles—even small ones of 10 microns and less!

MULTICLONE'S LOW MAINTENANCE... How the Multiclone has no high speed moving parts to repair or replace, no pads or filters to clean or renew, nothing to choke gas flow or increase draft losses as suspended materials are recovered. Multiclone draft losses remain uniformly low—recovery efficiencies uniformly high—at all times!

Make sure that a copy of this helpful booklet is in your reference files by sending for your copy now!

NO MATTER whether you are now using mechanical dust recovery equipment or are planning the installation of such equipment at some future date, here is a booklet that is full of helpful and valuable information on centrifugal dust recovery. It not only explains the basic methods and principles involved, but also shows the important differences between small and large diameter separating tubes, shows how to simplify your duct work and reduce installation costs, and outlines many other important factors to be considered in selecting mechanical dust recovery equipment.

In addition, this informative booklet illustrates and explains how MULTICLONE'S unique *vane* design is fundamentally different...how it makes possible greater compactness, simpler installation, high recovery of the small particles as well as the medium and coarser ones, and many other facts on MULTICLONE advanced design.

A limited supply of these booklets is available for free distribution to those interested in mechanical recovery equipment and methods. Write for your copy today.

NOW SELLING...

COTTRELL Precipitators
MULTICLONE Collectors
TURBULAIRE Spray Dryers

... in all parts of the U. S. A. and foreign countries.

WESTERN Precipitation CORPORATION

DESIGNERS AND MANUFACTURERS OF EQUIPMENT FOR COLLECTION OF SUSPENDED MATERIALS FROM GASES & LIQUIDS

Main Offices: 1012 WEST NINTH STREET, LOS ANGELES 15, CALIFORNIA
CHRYSLER BLDG., NEW YORK 17 • 1 N. La SALLE ST. BLDG., CHICAGO 2
1429 PEACHTREE ST. N.E., ATLANTA 5 • HOBART BLDG., SAN FRANCISCO 4
PRECIPITATION CO. OF CANADA, LTD., DOMINION SQ. BLDG., MONTREAL

THE NEWEST, QUICKEST WAY TO MAKE ENDS MEET

the job's a snap...with a snap-joint

Here's the newest development in Mechanical Pipe Couplings—the Victaulic Snap-Joint *boltless toggle* pipe coupling.

The Snap-Joint extends the Victaulic Method into usages where speed and frequent dis-assembly and re-assembly are controlling factors. Snap-Joints assemble over the pipe ends in a matter of seconds with a speedy hand-lock . . . no wrenches required.

Snap-Joints, made to supplement Victaulic's famous line of bolted couplings, are ideal for temporary lines, valve, meter and pump connections and similar uses . . . their strength and durability make them completely reliable for permanent installations.

Snap-Joints fit Victaulic grooved pipe and the complete line of Victaulic Pipe Fittings . . . Ells, Tees, Reducers, Caps, etc. Every joint serves as a pipe union.

New Victaulic Snap-Joints are ready for your next job through all Victaulic Stocking Supply Houses. Available in pipe sizes: 1", 1¼", 2", 3" and 4". They are part of the world famous *complete* Victaulic Method of Piping.

Write today for Victaulic Snap-Joint Catalog No. 44-8C

VICTAULIC COMPANY OF AMERICA • P. O. BOX 509 • **ELIZABETH, N. J.**

Office and Plant: 1100 Morris Ave., Union, N. J. • Telephone Elizabeth 4-2141
West Coast: Victaulic Inc., 2330 East 8th St., Los Angeles 21
Canada: Victaulic Co. of Canada Ltd., 406 Hopewell Ave., Toronto 10
Export: Pipe Couplings, Inc., 30 Rockefeller Plaza, N. Y. 20, N. Y.

MONTANA

● **Linton open-pit** lead-silver mine, 25 mi. east of Missoula, has been closed down because of the low lead price and mounting operating costs, according to Thomas J. Linton of Spokane. The mine was brought into production in July 1949, and through 1952 had been producing about 1-million lb. of lead annually. Operations have been on a curtailed basis since early this year. All equipment is being sold, but the property will be retained. Linton said he and his associates are turning their attention to a property at the head of German Gulch about 26 mi. southwest of Butte, which has been taken over under a lease and bond agreement. German Gulch area boasts a production record of about $13-million in gold, between 1864 and 1935.

● **Western Montana Exploration & Development Co.** of Missoula has announced plans for an extensive open-pit mining operation at its combined Shamrock-Wasa properties in Granite County, Mont., under the direction of Frank Eichelberger, Spokane consulting engineer. Overburden has already been stripped from about 600 ft. along the strike of the big Wasa-Shamrock-vein, and the pit work will be started in this area, with initial production at the rate of about 500 tons per day. Output will be increased as the pit is enlarged. As the work progresses it is expected that the large Homestake vein, which lies about 1,300 ft. from the Wasa-Shamrock structure and roughly parallel to it, will be worked from the same pit.

CORRECTION

In an article in the Montana news of *E&MJ* of November, 1953, it was stated that the Coronado Copper & Zinc Co. had taken over and was developing the property of the Mineral King Mining Co., near St. Regis, Montana. The Coronado Copper & Zinc Co. is a wholly owned subsidiary of Cyprus Mines Inc., of Los Angeles, and it is the parent company, instead of the subsidiary, that is doing the work on the Mineral King claims.

● **Cyprus Mines Inc.,** Los Angeles, has started exploration of a promising zone of radio-activity on the Water Hole property in Mineral County, Mont., under a contract with the Atomic Energy Commission. Now in progress is a crosscut to penetrate beneath the most favorable surface indications of uranium mineralization. The work is being directed by S. K. Garrett, vice president of Coronado Copper & Zinc Co. and resident manager of its operations in Northern Idaho and Western Montana. The Coronado firm is a wholly-owned subsidiary of Cyprus Mines.

HIGHER RECOVERY FROM LOW-GRADE ORES BY ION EXCHANGE

EXPANDING demand calls for the recovery of metals now *needlessly* going to waste . . . improved techniques for working lower grade, complex ores.

New Ion Exchange processes will play a big part in achieving these goals. For Ion Exchangers can pick up metals from dilute leaching or mine water solutions . . . return them as *10% concentrations*—at *low* cost. In fact, the more dilute the solution, the greater the savings over conventional processes.

METAL RECOVERY

Permutit Ion Exchangers are profitably at work recovering metals. A recent Permutit installation recovers copper from cuprammonium rayon wastes. Copper is present at only 25-40 ppm. Yet about a ton per day is recovered from waste water. Another plant is recovering zinc; several are recovering chromates.

Other applications range from purifying pickling solutions to the separation of rare earths in macro quantities.

Permutit is ideally equipped to work with your engineers in developing new Ion Exchange processes tailored to your needs. Only Permutit manufactures both Ion Exchange resins and equipment of all types—provides undivided responsibility for plant performance. Take advantage of our forty years of experience in Ion Exchange. Write today for full information on any Ion Exchange or water conditioning problem.

FREE TECHNICAL BULLETIN

Interesting, 16 page report on Ion Exchange suggests numerous new techniques for hydrometallurgy. It includes:

1. *Concentration*—Returns dilute solutions from mine waters or leaching as 10% solutions—at low cost.

2. *Separation* of mixtures of metals.

3. *Purification* of process or electrolyte solutions.

4. *Addition*—It is easy to convert salts to acids by Ion Exchange.

5. *Resin in Pulp*—Direct adsorption of metal ions by Ion Exchangers, followed by elution, promises considerable savings in investment, labor, pumping, loss to tailings.

MAIL COUPON TODAY!

PERMUTIT®

ION EXCHANGE AND WATER CONDITIONING HEADQUARTERS FOR OVER 40 YEARS

THE PERMUTIT COMPANY, Dept. EMJ-12
330 West 42nd Street, New York 36, New York

☐ *Please send me Free Bulletin "Ion Exchange in Wet Process Metallurgy"*
☐ *I would like further information on* _____

NAME _____

COMPANY _____

POSITION _____

ADDRESS _____

CITY _____ ZONE _____ STATE _____

(In Canada, please forward to Permutit Company of Canada, Ltd., 6975 Jeanne Mance Street, Montreal.)

E. A. GODOY & CO., INC.
CUNARD BUILDING, 25 BROADWAY
NEW YORK 4, N. Y.

SALES AGENTS
REPRESENTING PRODUCERS OF
CHROME ORES IRON ORES
MANGANESE ORES

ONE WAY TO INCREASE YOUR EARNINGS

Higher Ratio: *'Payload to Dead Weight'* with Differential Air Dump Cars

Differential design and construction skillfully combine greatest strength with lightest possible weight. Saves motive power, fuel, maintenance. Dead weight is an enemy of economy. *Differential makes the difference!* But that isn't all!

The automatic, either side dumping design — by **air** power is safer, faster — means still more economy. No matter what loose material there's 'more payload to dead weight' — more all around economy and lasting satisfaction in Differential Air Dump Cars.

Differential Products Include: Air Dump Cars, Locomotives, Mine Cars, Mine Supply Cars, Rock Larries, Mantrip Cars, Dumping Devices and Complete Haulage Systems.

DIFFERENTIAL STEEL CAR COMPANY
FINDLAY, OHIO
SINCE 1915 — PIONEERS IN HAULAGE EQUIPMENT

NEVADA

● **Nevada Mines Division** of Kennecott Copper Corp. has announced plans to open a new pit west of Kimberly to be known as the Veteran. Contract for removal of the first 4-million tons of waste has been awarded the Isbell Construction Co., Reno. As presently laid out, the new pit will yield approximately 20-million tons of slightly less than 1% copper ore. It will be approximately 2,500 ft. in length and 1,500 ft. wide. An estimated 60-million tons of waste material containing less than 8 lb. of copper per ton will be removed.

J. C. Kinnear, Jr., general manager of the company, says that when full production is started the Veteran will have a daily output of 5,000 tons. It will supplement and replace production of ore now coming from the Copper Flat Pit at Ruth, and the Kimberley Pit at Lane City, and will supplement ore to be mined at the Deep Ruth project.

● **After a long** and discouraging search, operators of the Summit King mine near Tonopah have reported finding a good-sized vein of silver ore which is said to show great promise. Last August a 250-ft. winze in the Summit King struck a rich orebody. Miners have since been trying to establish a continuation of the vein at that depth. The crosscut was driven through 100 ft. of barren rock, and early in October it was announced that prospects for success looked dim.

Due to the find, it is expected that Summit King will move its Nevada headquarters from Tonopah to Fallon and continue with plans to sink a new shaft and put in an ore treatment plant at the mine site.

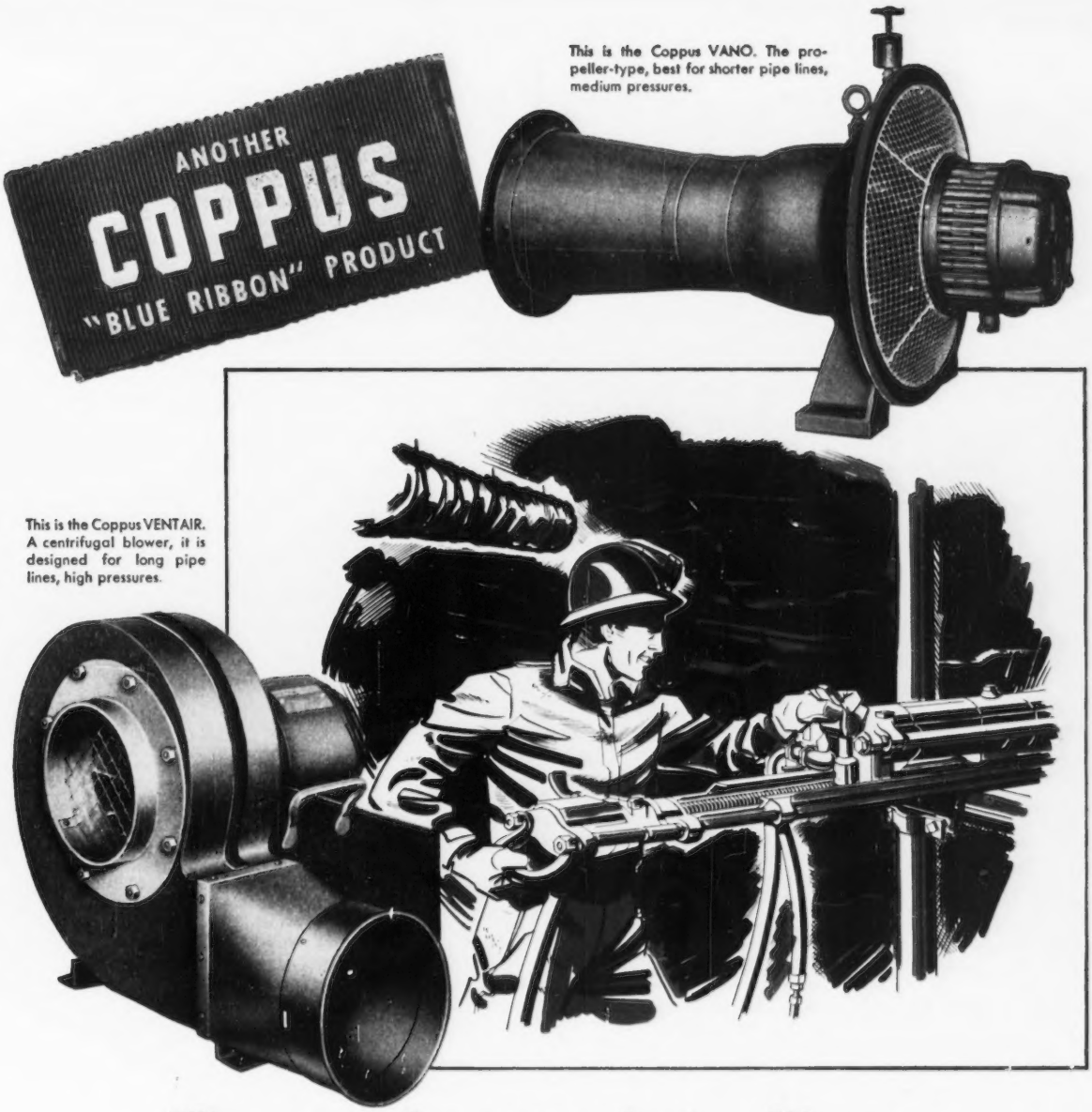
● **Sale of the** Silver Palace tungsten claims and mill to Paul Litell of Carson City has been announced by Harry Howard of Fallon, former owner of the property. Price, reported at $350,000, includes 15 patented mining claims in Nye County about 62 mi. north of Tonopah. The property is principally tungsten but contains lead, silver and zinc also. There is a mill on the site. Litell has installed new machinery in the mill, and has announced plans to produce and treat 50 tons daily for five years.

● **Truckee-Carson Irrigation District** officials have revealed that Reno and California interests are investigating the feasibility of a mill for treating perlite to be erected in the Fallon area. The backers, whose identity was not revealed, told the TCID they have a large deposit of perlite 20 mi. south of Fallon and were inquiring about the possibility of getting a substation erected to furnish the necessary power. If plans materialize, the mill will be constructed next spring on an area adjacent to the Kaiser Corp. mill west of Fallon.

● **Mines, mills and smelters** in Nevada were employing 5,763 men at

ANOTHER
COPPUS
"BLUE RIBBON" PRODUCT

This is the Coppus VANO. The propeller-type, best for shorter pipe lines, medium pressures.



This is the Coppus VENTAIR. A centrifugal blower, it is designed for long pipe lines, high pressures.

These are the cost-reducing Blowers that give up to 100% more air

Only Coppus makes both types — and both are made especially for *mine* ventilation. One or the other, operating under the conditions for which it is designed, delivers from 30% to 100% more air for a given power consumption than an ordinary all-purpose fan.

They can be used as blowers or exhausters and are driven either by compressed air or electric motor, with capacities up to 90,000 CFM. Like all Coppus products, these blowers wear the "Blue Ribbon" that stands for high achievement in engineering, workmanship and performance.

Representatives listed in MINING CATALOGS. Other Coppus "Blue Ribbon" products: steam turbines, gas burners, heat killers, air filters, blowers and exhausters for special purposes. See also THOMAS' REGISTER . . . Coppus Engineering Corp., Worcester 2, Mass.

COPPUS ENGINEERING CORPORATION
292 Park Avenue, Worcester 2, Mass.

Please send ..... Bulletin 130

Name .....

Company .....

Address .....

Nevada *(Continued)*

the last count, Mervin J. Gallagher, state mine inspector, announced during October. White Pine County leads with 2,031 mining men, and Clark County is second with 1,346. Other county totals include Churchill, 26; Douglas, 6; Elko, 27; Esmeralda, 77; Eureka, 28; Humboldt, 215; Lander, 151; Lincoln, 518; Lyon, 256; Mineral, 210; Nye, 311; Ormsby, 5; Pershing, 308; Storey, 52; and Washoe, 196.

● **All-steel mill** being constructed at the Manganese, Inc. site near Henderson, to replace the wooden manganese mill destroyed last June by fire is scheduled to be completed and in operation during January 1954, according to Sid McCarroll, plant superintendent.

The flotation and grinding plant has been completely redesigned by Manganese, Inc., engineers incorporating many new features to speed up production, McCarroll said.

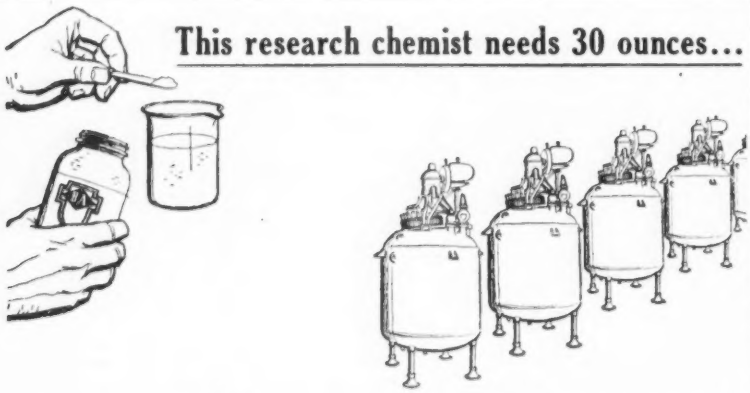
Having a capacity of 1,200 long tons a day, the plant will include these new features: Cyclone classification, multi-cell conditioning and increased cleaning from four to five stages. The ore bins and conveyor way which were destroyed by fire will be replaced by all steel construction.

During the shutdown, the company took the opportunity to add a new lead fume recovery unit to the kiln section. Recovery unit consists of two wet cyclonic scrubbers and has a 70,000-ft. hot induced draft pan.

These modifications of the kiln are nearly complete with operations scheduled to resume in November using concentrates which the company now has in storage.

Mill machinery installation is about 90% completed and building erection has started on the milling sections and should be completed in January, somewhat ahead of the original estimate.

Mining and stripping operations at the Three Kids Mine near Henderson which supplies the raw ore, will get underway Nov. 1 with Isbell Construction Co. doing the mining.



This research chemist needs 30 ounces...

and this company needs 30 tons a year...

Yet—for their Fine and Special Chemical requirements, both depend on

BAKER & ADAMSON®

America over, production and research men alike rely on Baker & Adamson as their most dependable source of fine and special chemicals *no matter what their needs!* They know that B&A's extensive and versatile production facilities are geared to produce fine chemicals of the same high purity in *tons* or in *ounces* . . . whether for product development or for commercial production.

Such adaptability can mean much to you, too. For example, among the 1,000 purity products that bear the B&A Shield of Quality are a number which may readily fit your particular requirements. Or if you need a special chemical "tailor-made" to your specifications, possibly B&A can develop it for you, as it has for so many other users of fine chemicals over the years.

So, whatever your needs — whether for high purity process chemicals or a special product custom-made to your specifications — you'll find *there's no better source than B&A!*

GC Allied Chemical

REAGENTS B·A STANDARD OF PURITY FINE CHEMICALS

BAKER & ADAMSON *Fine Chemicals*
GENERAL CHEMICAL DIVISION
Allied Chemical & Dye Corporation
40 Rector Street, New York 6, N. Y.

Offices: Albany* • Atlanta • Baltimore* • Birmingham* • Boston* • Bridgeport* Buffalo* • Charlotte* • Chicago* • Cleveland* • Denver* • Detroit* • Houston* Jacksonville • Kalamazoo • Los Angeles* • Minneapolis • New York* • Philadelphia* Pittsburgh* • Portland (Ore.) • Providence* • St. Louis* • San Francisco* • Seattle Yakima (Wash.) • In Wisconsin: General Chemical Company, Inc., Milwaukee

In Canada: The Nichols Chemical Company, Limited - Montreal* - Toronto* - Vancouver*

SETTING THE PACE IN CHEMICAL PURITY SINCE 1882

*Complete stocks carried here

NEW MEXICO

● **Western Machinery Co.,** San Francisco, announced that its Western-Knapp Engineering Division had been awarded a contract to design, build and equip a plant at Shiprock, N. M., to treat uranium-bearing ore, involving the expenditure of some $3-million.

The plant will be built for the Navajo Uranium Division of Kerr-McGee Oil Industries Inc. of Oklahoma City, Okla., and will be utilized for the production of uranium oxide for the Atomic Energy Commission.

It will be the first plant in the country designed expressly to treat uranium-bearing ores, others having been adapted from plants previously treating other ores or having been placed in pre-existing installations.

New plant also will be the first to use the so-called acidulation process of separating uranium oxide from carnotite ore, a process insuring maximum recovery, on which Western-Knapp Engineering has done much experimental work.

In addition to uranium, a substantial quantity of vanadium is expected to result as a by-product from the plant's operations.

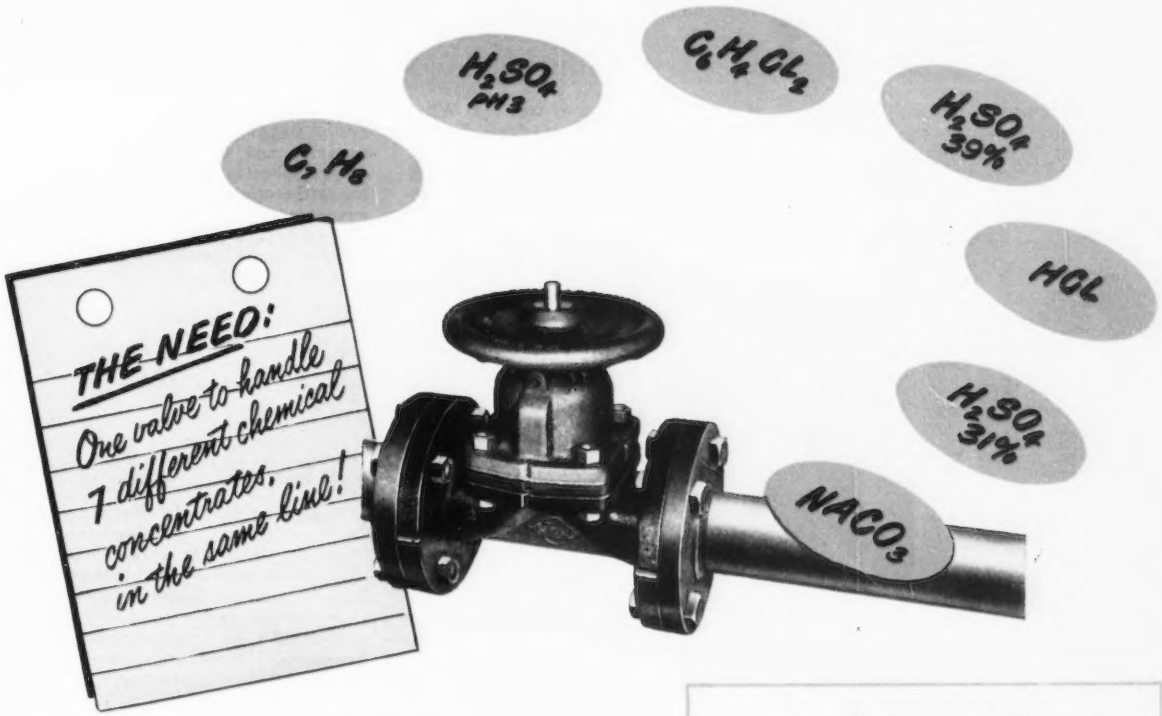
The Shiprock installation is scheduled to be completed by December 1954. Shiprock is located 93 mi. north of Gallup in Navajo Indian country near the heart of American uranium mining activity.

Western Machinery Co. and its Western-Knapp Engineering Division are engaged in worldwide operations in designing and building plants and manufacturing and distributing machinery used in ore beneficiation and other material-handling operations.

OREGON

● **A prediction** that ferronickel will be produced by next June at the M. A. Hanna Co. development at Riddle was heard on the mining and smelting project site by a Portland Chamber

What valve would you specify?



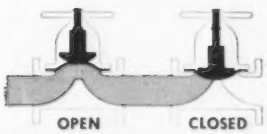
A manufacturer was looking for *one valve* which would handle *seven chemicals* of varying temperatures and concentrations, one after another, in the same line. They were . . .

SODIUM CARBONATE	PH 9	90°C
HYDROCHLORIC ACID	8%	100°C
SULPHURIC ACID	PH 3	20°C
SULPHURIC ACID	39%	42°C
SULPHURIC ACID	31%	15-20°C
TOLUENE	*(Full strength but associated with traces of other chemicals)*	

ORTHODICHLOROBENZENE — Cleaning Solvent

Valves suitable for use with these chemicals individually were available. But only *one valve* was found which could handle them in combination. It was the Grinnell-Saunders Diaphragm Valve, glass lined, with chemically inert KEL-F Diaphragm. The Grinnell KEL-F diaphragm not only prevented the liquid from attacking working parts, but it eliminated leakage around the stem.

Piping in today's complex industrial plants is an exacting science involving the handling of highly corrosive fluids, gases, compressed air, beverages, foods and suspended solids . . . in lines where corrosion, abrasion, contamination, clogging, leakage and maintenance are costly factors. Under such conditions, the amazing adaptability of the Grinnell-Saunders Diaphragm Valve explains its acceptance by industry after industry. For further details, write for Grinnell-Saunders Diaphragm Valve Catalog.



Features which have made Grinnell-Saunders Diaphragm Valves the specified valve in many different industries:

Streamlined flow. Smooth, streamlined passage, without pockets. Frictional resistance at a minimum.

Leak-tight closure against grit, scale, suspended solids.

Working parts absolutely isolated from fluid. Diaphragm completely seals off working parts from fluid in the line.

Body, lining and diaphragm materials to meet service condition. Bodies stocked in cast iron, malleable iron, stainless steel, bronze and aluminum; other materials on special orders. Valve bodies lined with lead, glass, natural rubber or neoprene. Diaphragm materials of natural rubber or synthetics.

Minimum maintenance. No refacing or reseating is required. No packing glands to demand attention. New diaphragm can be inserted without removing valve body from the line.

GRINNELL

WHENEVER PIPING IS INVOLVED

Grinnell Company, Inc., Providence, Rhode Island • Coast-to-Coast Network of Branch Warehouses and Distributors

pipe and tube fittings • welding fittings • engineered pipe hangers and supports • Thermolier unit heaters • valves
Grinnell-Saunders diaphragm valves • pipe • prefabricated piping • plumbing and heating specialties • water works supplies
industrial supplies • Grinnell automatic sprinkler fire protection systems • Amco air conditioning systems

Oregon *(Continued)*

of Commerce group which spent a day as company guests inspecting facilities under construction.

Earl S. Mollard, general manager for Hanna Nickel Smelting Co. told the 35 industrialists the installation of four electric furnaces should begin in January and initial ingots should be poured five months later.

Steel for the smelter structure, which along with other units of the multi-million dollar project is under contract to Bechtel Corp., San Francisco, was beyond 100 ft. in height the shop building completed, and four ore bins of 900 tons capacity erected. Clearing of the slopes of Nickel Mountain, source of the ore, is well advanced on the area where initial bench mining is planned. In the smeltering structure area, concrete nests for furnaces have been poured. This building is 400 ft. long and 120 ft. wide.

Company engineers explained the two-ton bucket cable tramway, to drop 2,400 ft. from ridge to operation site, is expected to have a capacity of 3,000 tons a day of wet ore. Wing belts will convey the ore from dumps, feed underground from the storage areas to driers which will burn oil or wood sawmill wastes, the latter plentiful in the lumber area industries. Dried and crushed ore will move from the four bins into a pair of rotating calciners, each 250 ft. long, from which it will feed at 700 deg. C into bins above the furnaces. Officials reported they are trying to determine what uses they might find for the slag. Tests indicate it is not usable for highway surfacing or aggregate.

The government contract for mining and smelting of the defense stockpiling program metal calls for quantities indicating an 8 yr. operating cycle. But on the basis of planned capacity and ore reserves a 30- to 40-yr. operation is indicated, assuming an economic operation after the government contract is completed. In this respect, *The Portland Oregonian* reported amortization is so arranged that Hanna can acquire the smelting facility, financed by government advance, for $2.8-million at the end of the stockpiling contract.

Mollard is a veteran of 35 years with Hanna and predecessor companies. Plant superintendent will be Emmons Coleman, who joined Hanna in May after 10 years with Bradley Mining Co., Stibnite, Idaho, and 15 years with Idaho Power Co.

● **Thomas Milling & Manufacturing Co.**, owned by L. H. Thompson and Lawrence Wilson, Ashland, is planning to expand a new concentrating mill in Ashland which was put into operation in early October for handling chromite ores of southwest Oregon and northern California operations. The mill, powered by a Buda diesel engine, includes a 12 in. jaw crusher, a 32 x 48 Denver ball mill and a Deister table. Expansion will mean addition of another ball mill and two tables. Bulk of the ore is being hauled from three properties near Red Mountain, 30 mi. southwest of the mill, two of which are leased.

NORTH CAROLINA

● **Substantial expansion** of Western North Carolina's mining industry is expected to result from the Federal Government's announcement that non-ruby mica is being included in the government's four-year mica purchasing program.

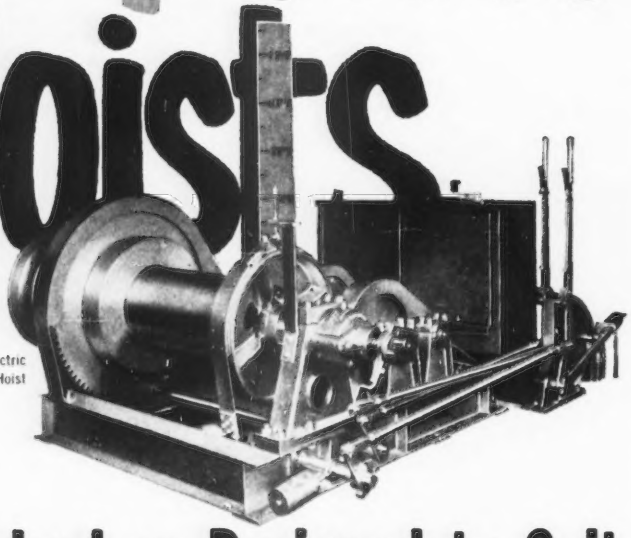
The new policy has brought opening of new mines, and gross sales of the non-ruby or "green" mica are expected to exceed a rate of $1.5-million annually by the end of 1953 and possibly reach $2-million by mid-1954.

Mining interests in the Spruce Pine area, say that the new purchase plan is expected to increase mining employment by 200 to 225 by Jan. 1. Some 700 persons are employed in mica mining in the area.

Most of the benefits from the new program will be realized by the Spruce Pine District, but operations in Jackson and Macon Counties also will feel the effect.

Although ruby mica, which the government started purchasing in

Superior Hoists



Friction Drum Electric Tow Haulage Hoist

Standard or Designed to Suit

Mine, shaft, incline and special hoists — large or small — designed to suit your specialized requirements, yet utilizing standardized parts. This is possible through modifying and recombining standard parts, the result of engineering skill gained by Superior-Lidgerwood-Mundy over many years of designing and building a full range of these types of hoists. In addition to hoists built to order, Superior-Lidgerwood-Mundy produces high quality standard hoists.

Write for bulletins and catalogs!

Superior-Lidgerwood-Mundy Corporation

Main Office and Works: SUPERIOR, WISCONSIN, U. S. A.

New York Office, 7 Dey Street, New York 7, N. Y.

PHILADELPHIA
Worm Gear Reducers

...GIVE YOU ALL THESE FEATURES

Worms are of alloy steel with carburized, hardened and tempered threads (both shaft and threads are accurately ground *after* heat-treatment.)

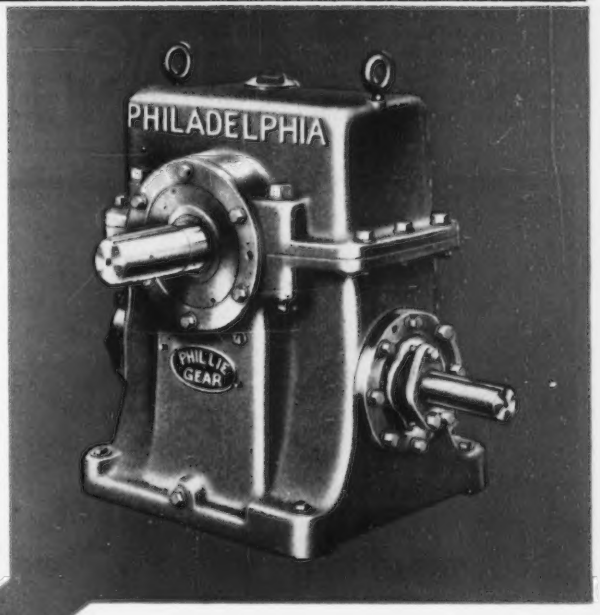
Worm Gears are of highest quality chill-cast nickel bronze.

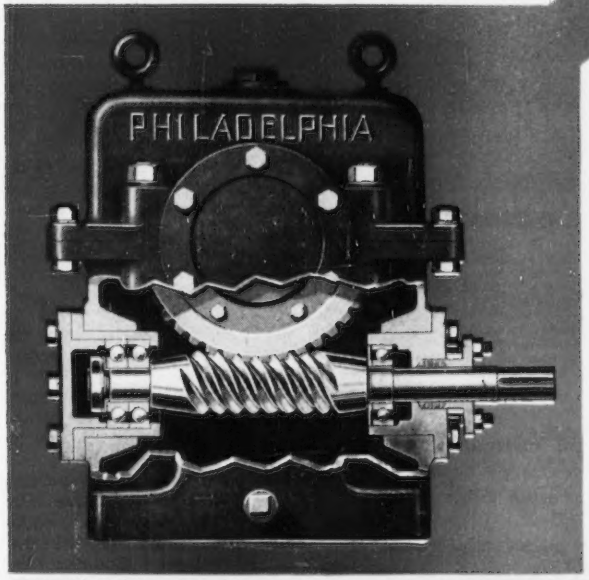
Bearings are anti-friction types (ball or roller) best suited for smooth, quiet, long-lived operation.

Housings are Quality Grey Iron, compact, rigid, neat and of ample radiating surface (to prevent overheating).

Lubrication is by Splash Systems to all moving parts—in oil-tight housing.

A.G.M.A. Ratings are carried by all Philadelphia Units.





Units are available with *Worms above or below* the *Worm Gear* for Horizontal Drives, or with shafts extending *up* or *down* for Vertical Drive requirements . . . all in single or double reductions. And, for very efficient Right Angle Drives, there is a complete line of Philadelphia *Helical-Worm Gear Reducers.*

For Vertical Drives requiring long unsupported shafts, there is a complete line of Type VTS Units, known as *Philadelphia Vertical Steeple-Type Worm Reducers.*

Send for 88 page *Worm Reducer Catalog*, which gives full data for ordering; diagrams; installation views; section views of all units, etc.

Philadelphia Gear Works, INC.

ERIE AVE. AND G ST., PHILADELPHIA 34, PA.

NEW YORK · PITTSBURGH · CHICAGO · HOUSTON · LYNCHBURG, VA.

Industrial Gears and Speed Reducers
LimiTorque Valve Controls

North Carolina *(Continued)*

July 1952, commands a price about 20% higher than the non-ruby variety, greater volume from non-ruby mica deposits are expected to more than offset the price differential.

So far, ruby mica sales at $12 a pound for refined ore, have totaled $1.6-million in the area since the government purchase program began.

H. E. Harman, Jr., regional director, General Services Administration, said it would not be necessary for a producer to obtain another participation certificate, the certificate previously obtained for sale of ruby mica also being good for the sale of the non-ruby type.

UTAH

● **Gold Hill district,** once one of the state's richest gold and silver producing areas, is enjoying a mild boom as a result of the government's guaranteed price for tungsten, and extension of the Federal procurement program for tungsten until 1958.

While the tungsten operations are comparatively small, they have led to opening of a mill and refinery in Salt Lake City, development of scattered properties in Juab County and near Delta, and plans for operations in the historic Alta district.

Principal operators in the Gold Hill district are Gold Hill Exploration Co.; Stardust Mines, Inc.; Timco, Inc., and Tungsten Mines, Inc.

Gold Hill is operating a 25-ton capacity gravity mill to concentrate its ores; Stardust is running a gravity mill handling 15 tons of high grade ore daily from Stardust and Timco mines, and is doing custom milling for other operators.

Concentrates running 55% WO_3 or higher go directly to the government. Middlings are sent to the H. M. & S. Milling Co. in Salt Lake City, and are then refined to government specifications by the Salt Lake Tungsten Co., a new subsidiary of Minerals Engineering Co. and Sylvania Electric Products Inc. Government purchases are in ton lots at $6,300 a ton.

According to Fred Cook, president of Stardust, current plans call for placing the mill on a two-shift operation as more ore becomes available. A compressor, jackhammer and other equipment will be moved to the property shortly.

Timco, operating a high-grade vein, has a $2,250 DMEA loan for bulldozing which is expected to expose surface veins and lead to open pit operations.

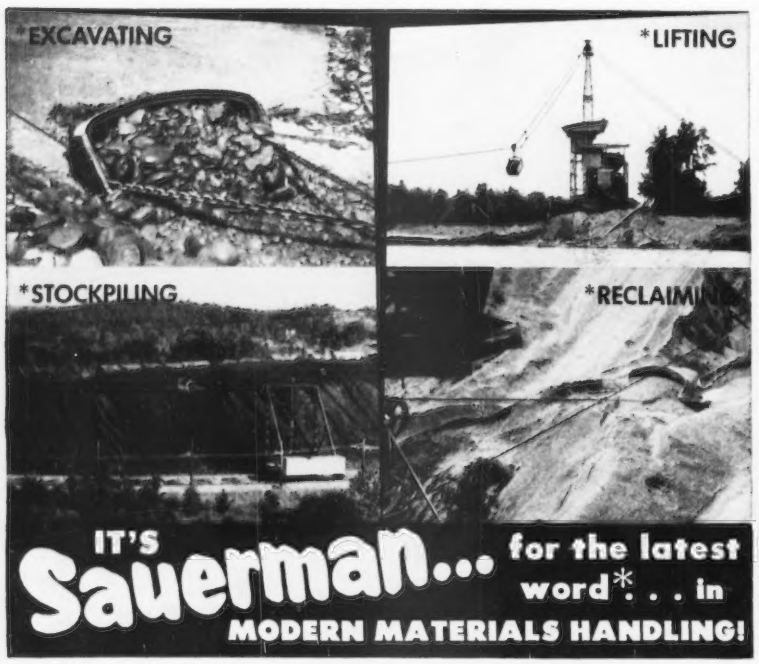
Stardust officials believe they are working the longest continuous vein of high-grade tungsten in the world. Averaging 62.5% WO_3, it has been followed for some 135 ft. and produces 5,422 tons of ore between 1937 and 1944. Output since the government stockpile operation resumed in 1951 has produced 400 tons of ore. One tungsten "kidney" found on the property brought a record $56,000, according to operators.

Timco, headed by Dr. W. N. Shaw, manager of Salt Lake Tungsten, and Stardust Mines Inc., employs a total of 16 men on the two properties in the mill. Associated with Cook and Shaw is W. A. Storey, who is also a partner in the H. M. & S. Milling co.

Dr. F. F. Hintze, president of Tungsten Mines, Inc., is operating the Burdick lease on the Stardust property, and he reports other holdings of his firm in the district are scheduled for development. Tungsten Mines, Inc., has a DMEA loan of $24,000 for development and exploration.

Other tungsten properties reporting activity in Utah are Blue Star Mining Co. in the Beaver district, which plans a $50,000 mill; the Scheelite Queen Mines in Beaver County; Lone Pine Mine in Box Elder County and the Leggett Tungsten claim at Brighton in the old Big Cottonwood district.

● **Naildriver Mining Co.,** United Park City Mines Co., affiliate has reported encountering mineralization in its exploration project in the Park City district. The firm is conducting exploration at depth off the Star of Utah tunnel seeking extension of the



IT'S Sauerman... for the latest word*. . . in MODERN MATERIALS HANDLING!

Upper left: 4-cu. yd. Crescent Scraper excavating from a river bottom, brings in a load of stone with very few fines for a western sand and gravel company.

Upper right: 2-cu. yd. Slackline Cableway spanning an average of 450 feet, lifts and conveys from an underwater deposit to a high hopper at the rate of 75 tph.

Lower left: 8-cu. yd. scraper machine is stockpiling 300 tons per hour, over an arc of 450 feet radius in a 225,000-sq. ft. storage area. Tail tower is remotely controlled from elevated cab above hopper.

Lower right: 2-cu. yd. Crescent working between a fixed head point and movable tail tower, reclaims phosphate from all points about the periphery of a roughly semi-circular storage area.

Sauerman systems are providing efficient, economical materials handling at installations throughout the world. Over large or small areas . . . indoors or out . . . on special or routine jobs.

Let Sauerman's skilled engineering staff develop a system best suited to your particular requirements. Send today for pertinent field reports and general catalogs in your field of materials handling.

SAUERMAN BROS., INC.
584 S. Clinton St., Chicago 7, Ill.

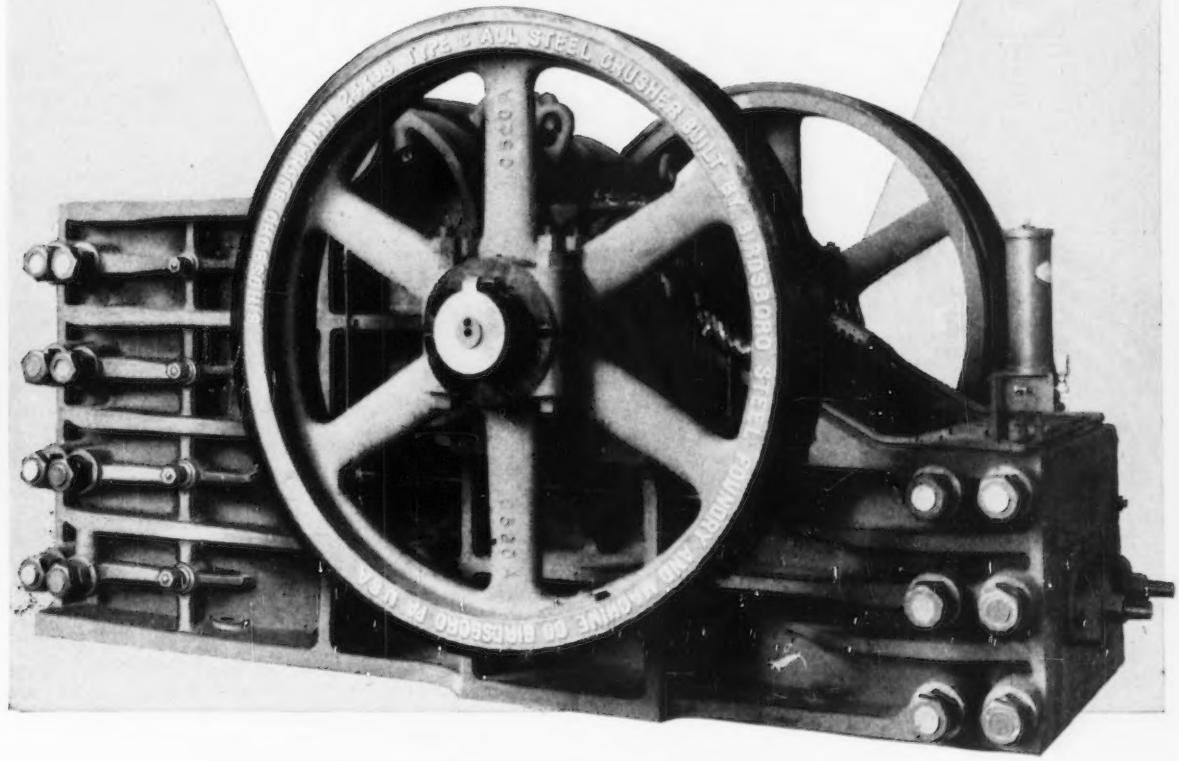
ONE MAN MATERIALS HANDLING

SAUERMAN BROS., INC.

dependable
low cost crushing

BIRDSBORO-*Buchanan*

DEEP FRAME CRUSHERS



• For example, the 24″ x 36″ Deep Frame crusher shown here is the *third* Birdsboro-Buchanan Crusher to be put into operation by *one* company. These *all-steel* patented crushers are built for high capacity and long service life with heavier frames, longer jaws, bowed type interchangeable jaw plates and renewable end toggles. Available in sizes up to 66″ x 84″, you'll find Birdsboro-Buchanan crushers meet most primary crushing requirements. Drop us a line for more details.

World Wide Agent Representation. Contact home office for nearest representative

BIRDSBORO

BIRDSBORO STEEL FOUNDRY & MACHINE CO., BIRDSBORO, PENNA.

BIRDSBORO BUCHANAN JAW CRUSHERS

CR-1-53 R

Offices in Birdsboro, Pa. and Pittsburgh, Pa.

•**designers and builders of:** Crushing Machinery • Hydraulic Presses • Steel Mill Machinery • Rolls • Special Machinery • Steel Castings

Utah *(Continued)*

old silver-lead-zinc Naildriver orebody.

● **M. C. Clark**, Castlegate, and Sharon Johnson, Price, have filed 114 uranium claims 15 mi. north of the Delta mine on the Muddy River in Emery County. They report a 40 ft. drift on the contact of the Shinarump and Moenkopi formations shows "good grade ore," but note that further exploration and development will be needed to prove existence of a large orebody.

● **New Park Mining Co.**, long-time operator in the Park City lead-zinc district, has obtained an agreement with operators of the Dalton Ranch on Montezuma Creek, San Juan County, for uranium prospecting on the property. W. H. H. Cranmer, New Park president, noted that lands to the north and south of the ranch have been withdrawn by the AEC. There have been "fair" indications of uranium ores on the ranch, mine company officials said.

● **Moss Copper Co.**, Provo, is diamond drilling the old prospect of the defunct Ohio Copper Co. in Big Indian Canyon, San Juan County. Both uranium and copper values are being sought. A recent drill core from 155 ft. to 315 ft. showed up to 5% copper values and .07 uranium values. Carl J. Harris, Provo, heads the firm, with Joseph Hafen, Provo, general superintendent.

USED ON EVERY TYPE DRILLING OPERATION

Whether it be water exploration in San Diego County, grout hole drilling on dam sites in Washington, deep hole drilling on the Colorado Plateau, or underground long-hole exploratory drilling in Idaho — your assurance for less cost per foot drilling is a . . . CHRISTENSEN DIAMOND BIT.

LESS COST PER FOOT CHRISTENSEN DIAMOND PRODUCTS

CHRISTENSEN

DIAMOND PRODUCTS COMPANY

1937 South 2nd West Salt Lake City, Utah

WASHINGTON

● **A new threat** to mining in the Metaline District developed when Seattle City Light announced it will study the Boundary site on the Pend Oreille River as a possible location for a dam.

Boundary, 1 mi. south of the Canadian border, was suggested by the Corps of Engineers for a hydroelectric development but was dropped in 1947 due to bitter opposition from mining interests. The dam, if built as the engineers planned, would have flooded $6-million worth of claims in the Metaline lead and zinc district, it was pointed out.

If a dam were constructed now it would have to be smaller than the one planned by the Corps, since they proposed a dam that would flood an area now occupied by Box Canyon Dam.

Mining interests, principally American Lead & Zinc and Pend Oreille Mines & Metals, have voiced opposition to any new proposal to develop Boundary.

Dale I. Hayes, western manager for American Lead & Zinc which operates the Grandview property among others, declared the Boundary project "would be a substantial hazard to the extraction of potential ores in the district."

Jens Jensen, vice president and treasurer of the Pend Oreille Mines & Metals Co., said he expects mining in the area to continue for another 50 years, and a dam at Boundary would substantially reduce the life of the district.

Seattle's municipal board of public works passed a resolution permitting Supt. E. R. Hoffman to apply to the Federal Power Commission for a preliminary permit for the dam.

● **Grandview Mines** of Spokane has begun work in northern Stevens County, on two lead-zinc exploration projects recently approved by the DMEA.

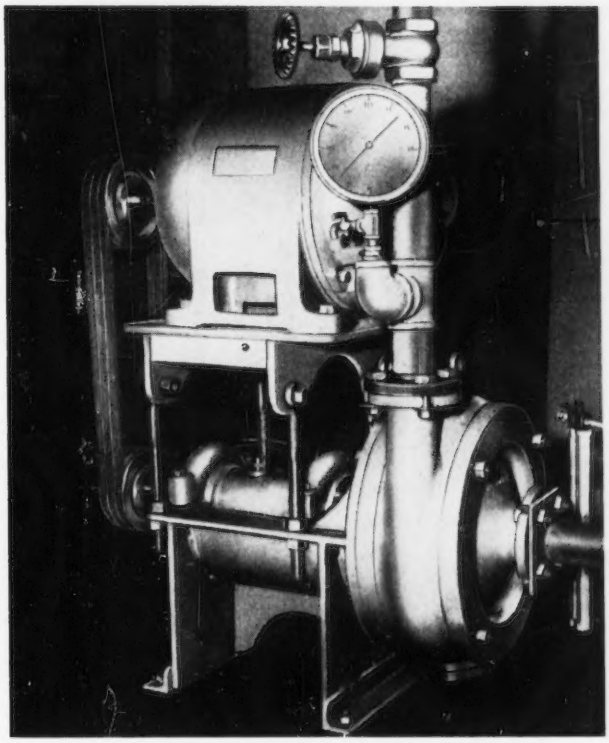
President Karl W. Jasper says three diamond drilling crews are working, two in the Current Creek area, and the other at the Hartbauer property near Deep Lake.

DMEA and Grandview are sharing the cost of a $36,400 drilling program near Current Creek on three prospects. They are spending $21,000 on the Hartbauer development adjoining the Anderson open-pit mine of Goldfield Consolidated Mines, Reno.

● **Western States Copper Corp.**, Seattle, headed by Charles Sisenvine, president and general manager, has shipped its first carload of crude copper ore to the Tacoma smelter from its mine 15 mi. northeast of North Bend. The ore had an assay value of $55 a ton, Sisenvine reported. The company, operating under a Defense Mineral Exploration Act loan, has two shifts at the mine, working face of which now is at a depth of 135 ft. below the surface.

3rd year of successful service

VACSEAL VERTICAL PUMPS



L & STANDARD

This success story concerns a Vacseal Pump — the first manufactured and put in service in the United States. It was installed for the handling of abrasive pulps back in 1950. Its three years of operation has been satisfactory in every way. Only one part has been replaced and the pump has required minimum servicing. In fact, this and many other Vacseal Pumps — vertical and standard — have been used in exhaustive and gruelling tests over the 3-year period, handling both abrasive and corrosive materials. The detailed records spell out . . .

EXCELLENT SERVICE

WRITE FOR CATALOG

Gives full details on unique VACSEAL "glandless" feature that eliminates impeller adjustments and requires no sealing water to protect glands and clearance spaces.

Leaders in Experience & Service

THE GALIGHER CO.

METALLURGICAL DIVISION · ENGINEERING SERVICE

CONSULTATION • ORE TESTING
PLANT DESIGN • GEOLOGIC INVESTIGATION

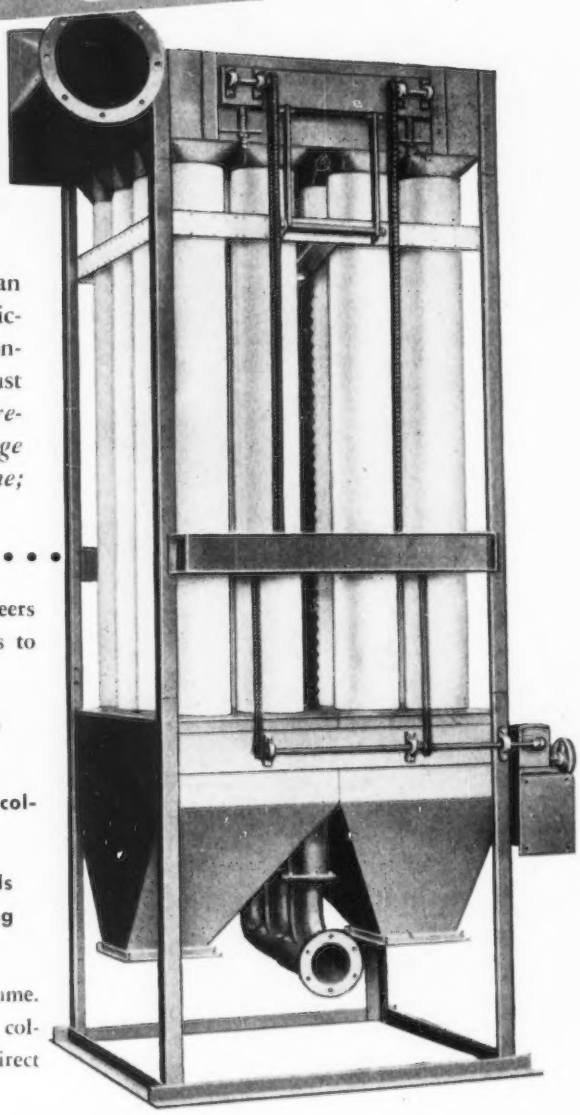
HOME OFFICE
545 West 8th South
Salt Lake City, Utah
P. O. Box 209

EASTERN OFFICE
921 Bergen Avenue
Jersey City, New Jersey

Agents In All Principal Foreign Mining Districts

Introducing

AMER Jet



A better REVERSE JET TYPE FABRIC DUST ARRESTER Built to exacting AAF design and performance standards

Just what you'd expect from the leader! American Air Filter has developed and field tested a fabric-type dust arrester incorporating the same basic concept and design features found in all AAF Dust Control Products, namely—*small space requirements; maintained performance over a wide range of operating conditions; constant exhaust volume; high collection efficiency.*

With these proven advantages established, AAF engineers then "iced the cake" with these additional features to further increase AMERjet's over-all efficiency—

- **Tension control to compensate for variation in fabric dimensions due to humidity changes.**
- **Rugged, foolproof mechanism for dislodging collected material with high pressure jets.**
- **Venturi-shaped inlet for dust-laden air extends life of cloth by greatly reducing the abrading effect.**

AMERjet is available for handling any exhaust volume. For complete information on this new dry-type dust collector, call your local AAF representative or write direct for Bulletin No. 279.

AAF

American Air Filter

COMPANY, INC.

193 Central Avenue, Louisville 8, Kentucky • American Air Filter of Canada, Ltd., Montreal, P. Q.

IN CANADA

QUEBEC

• **Molybdenite Corp. of Canada,** sole Canadian producer of molybdenite, will be increasing its output next year. Work has been started on the deepening of the shaft from 625 to 800 ft. and expansion of mill to 500 tons from its previous 250-ton capacity. The mine is in LaCorne twp.

• **Milling** by Opemiska Copper Mines (Quebec) Ltd. is expected to start this month. The 400-ton mill is just about ready and enough ore (grade 4.82% copper) has been proven to provide millfeed for seven years. Property, controlled by Ventures Ltd., is 25 mi. west of the new town of Chibougamau.

• **Opemiska will be** Chibougamau's first producer. The second will be Campbell Chibougamau Mines on Merrill Island, Dore Lake; but it will not reach the milling stage until the spring of 1955, for it will be a big tonnage proposition and the management sees no purpose in trying to start production before hydroelectric power is available. The plant will have initial rated capacity of 1,750 tons. Construction already is started.

• **A third company** in the area, Chibougamau Explorers, is making good progress toward the production planning stage. This gold-copper prospect, controlled by Anacon Lead Mines, is planning a shaft deepening job that will permit establishment of five additional levels down to the 1200-ft. horizon.

• **Quebec's principal** nickel-copper prospect also plans shaft deepening. Eastern Metals Corp., with property some 65 mi. southeast of Quebec City in the Eastern Townships, proposes to carry its shaft down to 1,150 ft. to open four new levels. Present deepest work is at 450-ft. horizon where a substantial tonnage is developing.

• **Another name** can be added to the list of companies prospecting for lithium. Quebec Tantalum & Lithium Mining Co. has been diamond drilling on its property in the Amos District. The company has two properties: one in Figuery and one in Villemontel twp. Both are astride the geologically favorable belt that crosses the area.

• **Johnson's Asbestos Co.,** privately owned pioneer in Quebec's asbestos country, is just about ready to start crushing ore in its new 4,000-ton mill at Black Lake. New plant, built at cost of $8.5-million, replaces the 750-ton mill which has been operating profitably for many years.

ONTARIO

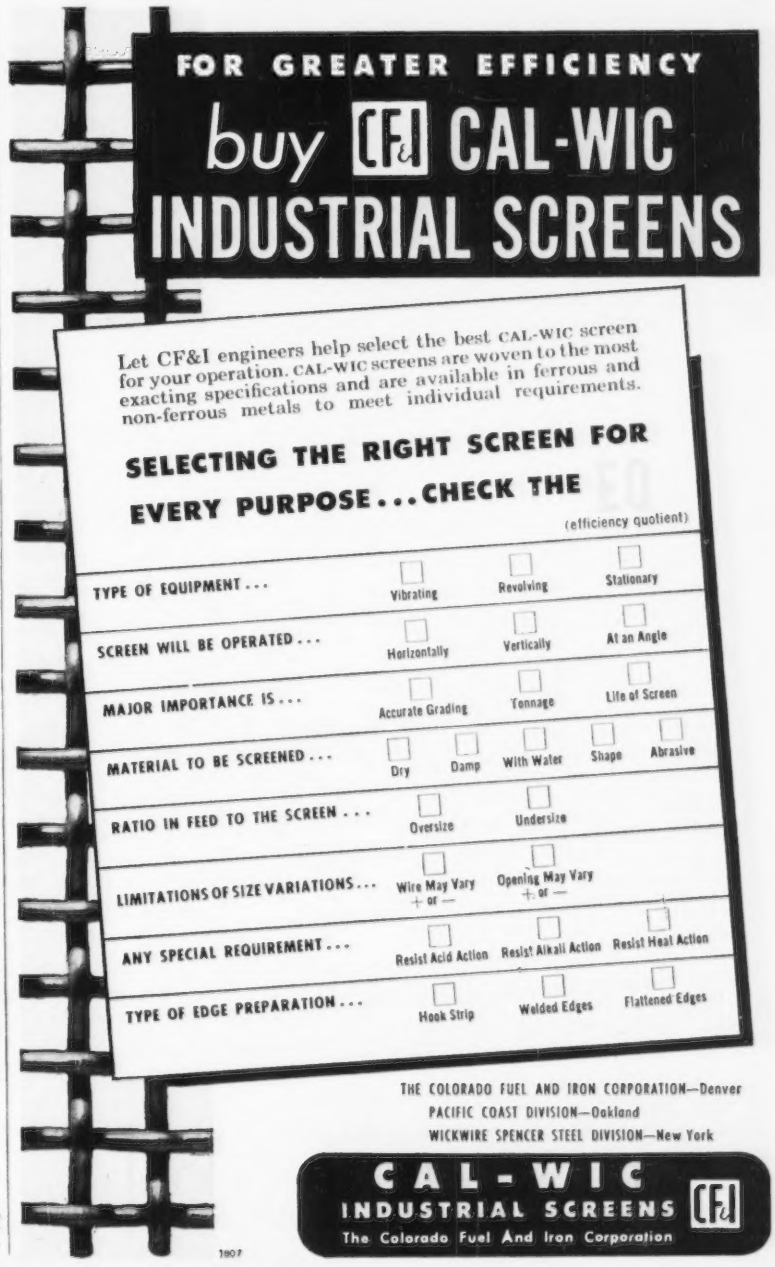
• **New Mosher Longlac Mines,** one of Canada's few gold prospects now operating underground, reports excellent results from drifting and drilling on its first level; 1100 ft. of ore that will average about 0.25 oz. gold per ton across width of between 20 and 40 ft.

• **A revived silver producer** is being established in the Cobalt camp. Nipissing-O'Brien Mines, merger of the two old properties linked in the company name, has bought the nearby 100-ton Colonial mill of Cobalt Consolidated Mining Corp. and expects to have the crushers pounding by year-end. It is expected that the mine will become the area's biggest silver source.

• **Long-term plans** are being laid by Falconbridge Nickel Mines for development of its Fecunis Lake property on the northwest rim of the Sudbury Basin. A nominal estimate of 10-million tons with combined grade of 3% nickel-copper has been made from the surface drilling done during the past year or so, and underground work is being laid out on an appropriately big-time basis.

• **Fecunis,** another Falconbridge nickel-copper source came into production in October when Nickel Offsets Ltd. started shipping concentrates from its 300-ton mill.

(*Continued on page 163*)


FOR GREATER EFFICIENCY
buy CF&I CAL-WIC
INDUSTRIAL SCREENS
Let CF&I engineers help select the best CAL-WIC screen for your operation. CAL-WIC screens are woven to the most exacting specifications and are available in ferrous and non-ferrous metals to meet individual requirements.
SELECTING THE RIGHT SCREEN FOR EVERY PURPOSE...CHECK THE
(efficiency quotient)
TYPE OF EQUIPMENT... Vibrating Revolving Stationary
SCREEN WILL BE OPERATED... Horizontally Vertically At an Angle
MAJOR IMPORTANCE IS... Accurate Grading Tonnage Life of Screen
MATERIAL TO BE SCREENED... Dry Damp With Water Shape Abrasive
RATIO IN FEED TO THE SCREEN... Oversize Undersize
LIMITATIONS OF SIZE VARIATIONS... Wire May Vary + or — Opening May Vary + or —
ANY SPECIAL REQUIREMENT... Resist Acid Action Resist Alkali Action Resist Heat Action
TYPE OF EDGE PREPARATION... Hook Strip Welded Edges Flattened Edges
THE COLORADO FUEL AND IRON CORPORATION—Denver
PACIFIC COAST DIVISION—Oakland
WICKWIRE SPENCER STEEL DIVISION—New York
CAL-WIC
INDUSTRIAL SCREENS
The Colorado Fuel And Iron Corporation
1807

Showin 'Em How in the "Show Me" State

STRIPPING OVERBURDEN 14 feet deep near Appleton City, Mo.

W. A. JOHANNIGMEIER, partner in the J. & W. Coal Company, speaks from experience when he says International crawlers beat 'em all in the coal fields.

Missouri miner tells how International power means bigger profits on wintertime stripping job

A gold-mine in a coal mine—that's what an International crawler is for owner W. A. Johannigmeier of Appleton City, Missouri. His rugged red TD-14A pays off year 'round doing custom work during the summer months and coal stripping from August until March.

"This is my third International crawler since 1946, and believe me, they can't be beat," says owner Johannigmeier. *"When I got my TD14A, I traded in a smaller TD-9 that had given me no trouble at all. This long life and top performance have made my Internationals real money makers.*

"They outperform other crawlers at coal stripping because they have more speed, and better maneuverability. Their specifications show this . . . and so does my experience!"

See your nearest International Industrial Distributor for full facts and figures. Put International "Power that Pays" to work for you—now, and for years to come!

INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILL.

INTERNATIONAL

INTERNATIONAL HARVESTER

NEW BRUNSWICK

• **A year of grace** has been given on assessment work which should have been completed by Oct. 31, 1953. Stakings this year, close to 40,000 claims, set a Canadian record. Many operators found themselves unable to secure either the men or equipment necessary for assessment work and the Department of Mines decided to ease the situation by permitting claim renewals without it, for this year only.

• **It is probable** that New Larder "U" Island Mines will be underground this winter. Plans are being drawn up for a shaft which will be sunk to a depth of at least 1,000 ft. Surface drilling has indicated a substantial orebody carrying lead, zinc, and silver. Dimensions and grade can't be calculated yet, but it is evident that volume will reach several thousand tons per vertical ft. with values adequate for good profits. The company, one of the original Boylen organizations in the Bathurst area, has close to $1-million cash on hand.

• **New Brunswick** may provide Canada with its first manganese production in many years if the hopes of New Delhi Mines materialize. The company, which already has properties in Ontario and Saskatchewan, holds majority interest in Canadian Manganese Mining Corp., formed to develop a prospect 6 mi. west of the town of Bathurst.

Management reports ore in the order of 75,000 tons per vertical ft. grading 7.5% manganese. An open pit operation and a 5,000-ton concentrator are visualized.

NOVA SCOTIA

• **Mineral prospecting**, under the impetus of New Brunswick's success during the past year, has been more active in the past few months than in any previous period of Nova Scotian history. Many companies, individually or collectively, have been busy in the search.

• **Bathwick Mines**, another Bathurst area pioneer, has crossed over into the peninsular province and has acquired a copper prospect located on the shore of the Bay of Fundy.

• **Extensive aerial surveying** is planned by Detta Minerals Ltd. and Mineral Exploration Corp., two companies holding large exploration concessions on Cape Breton Island.

BRITISH COLUMBIA

• **Half the giant** hydro-electric power tunnel that will provide water for the Kemano powerhouse which will feed Aluminum Co of Canada's new Kitimat refinery, has been completed. Late in October miners broke through and joined up the two sections of the 5-mi. western end of the tunnel between Kemano and Horetzky Creek. The two sections met on the nose.

Eastern section of the tunnel between Horetzky Creek and Tahtsa Lake was slated for completion by the end of November. The tunnel now is slightly ahead of schedule. Concrete flooring of the tunnel is expected to be completed by next March, and late in May first power is due to be produced in the underground Kemano powerhouse, sending the Kitimat refinery into production at once.

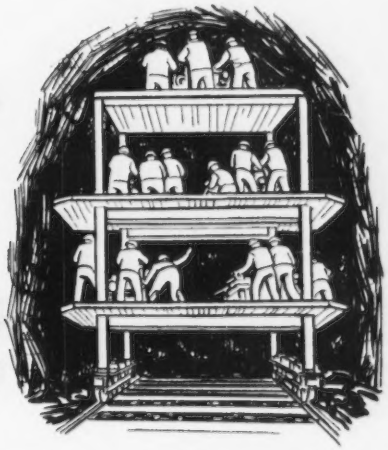
• **Silver-lead-zinc ore** grading between 23% and 25% combined lead and zinc in a width of 9 ft. is being opened up in Estella Mines Ltd.'s Wasa operation.

• **Steadily rising** tungsten production is reported at the Red Rose mine of Western Tungsten Copper Mines Ltd. at Skeena Crossing, with a new output record of 178 tons of ore being milled in 24 hours on Sept. 18, company officials said.

• **Rexspar Uranium & Metals Mining Ltd.**, with preparations for start of underground development on the Black Diamond orebody 70 mi. north of Kamloops, reports current exploration in the "F" zone sector open-

Morrison-Knudsen Tunnelmen use Atlas Hollow Drill Steel to establish

5 WORLD RECORDS ON ALCAN B.C. PROJECT



282 feet of forward progress on a 25-foot tunnel through solid rock in six working days! That's the sensational drive which set a new world tunneling mark early this year for M-K crews working on the huge Alcan project at Kemano, B.C. It topped no less than four previous world records set by the same crews on the same job during preceding months.

This achievement demanded really outstanding performance from men and machines—*and drill steel*. The record-smashing tunnelers used Atlas Ottawa—a carbon-type hollow drill steel and detachable bits. Ottawa along with other Atlas mining steels, enjoys an unexcelled reputation in hundreds of Canadian mines.

READ THESE REMARKABLE ATLAS OTTAWA PERFORMANCE FIGURES
(WEEK OF FEBRUARY 16 TO 21, 1953)

Advance: 282' (West heading, 25-foot-diameter Horetzky to Kemano tunnel)
Number of machines on Jumbo: 15
Number of rounds: 28
Average advance per round: 10.07'
Average drilling time per round: 1 hr. 35 min.
Average yardage per round: 219.53 cu. yards
Total mucking time: 75 hrs. 39 min.
Total yardage in place: 6627 cu. yards
Yards mucked per hour: 87.01 cu. yards
Average advance per day: 47'

Write (on company letterhead, please) for valuable technical bulletin on Atlas Mining Steels.

ADDRESS:

ATLAS STEELS LIMITED
WELLAND — ONTARIO

AS7-M

Offices and warehouses at:
Montreal, Toronto, Hamilton, Windsor, Winnipeg, Vancouver.
Agents throughout the world

ATLAS MINING STEELS

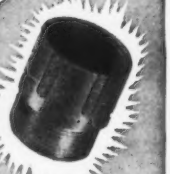
Atlas Ottawa Hollow Drill Steel | Atlas Nushank Hollow Drill Steel | Atlas Chippewa Hollow Drill Steel | Atlas Vibresist Hollow Drill Steel | Atlas Solid Drill Steel | Atlas Detachable Rock Bit Steel

Lower Reaming Costs with J. K. SMIT REAMER SHELLS

For minimum reaming costs combined with high efficiency in action, J. K. Smit Reamer Shells are the answer to your drilling problems.

Our tapered design distributes the load over the entire diamond section and gives high cutting efficiency and long useful life.

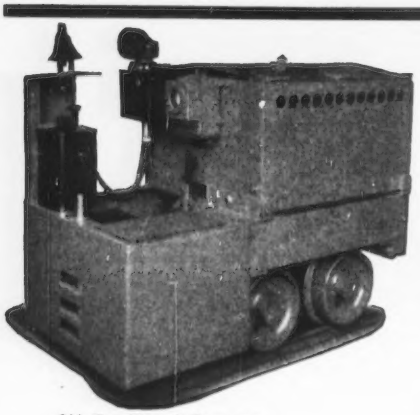
Consult our engineers for technical advice on how to reduce your diamond drilling costs. Let us help you with the proper selection of diamond quality, size, matrix metal and other factors which must be considered when buying Diamond Bits and Reamer Shells.



STRIP TYPE

RING TYPE

J. K. SMIT & SONS, INC.
MURRAY HILL, N. J.



1½-Ton Type-J Trammer

South African Representative
Universal Mechanisation Co. (Pty.) Ltd.
Johannesburg, South Africa

Sold in Canada by
Mine Equipment Co. at Kirkland Lake, Ont.

International Agencies & Machinery Co. Ltd. at Vancouver, B. C.

You Benefit ALL WAYS with ATLAS TRAMMING LOCOMOTIVES

- MOST SIMPLE IN DESIGN
- COST LESS TO BUILD
- COST LESS TO OPERATE

Operators using Atlas trammers find that their economy is matched by dependable day-in day-out service. Why not let us explain the advantages of Atlas trammers in your operations.

WRITE TODAY FOR COMPLETE INFORMATION

THE ATLAS CAR & MFG. CO.
ENGINEERS MANUFACTURERS
1140 IVANHOE RD. CLEVELAND 10, OHIO, U. S. A.

British Columbia *(Continued)*

ing up a large area of higher than normal radioactivity. Numerous outcrops and float material in the "F" zone area give scintillometer readings as high as 10 times background. The zone appears to occupy the same horizon as the Black Diamond orebody. A diamond drill is being moved into the area.

MANITOBA

• **God's Lake Gold Mines** reports that the electro-magnetic survey of its large property in the Lynn Lake area in Manitoba is now sufficiently advanced to permit the start of a diamond drilling program. Drilling is scheduled to begin after freeze-up.

SASKATCHEWAN

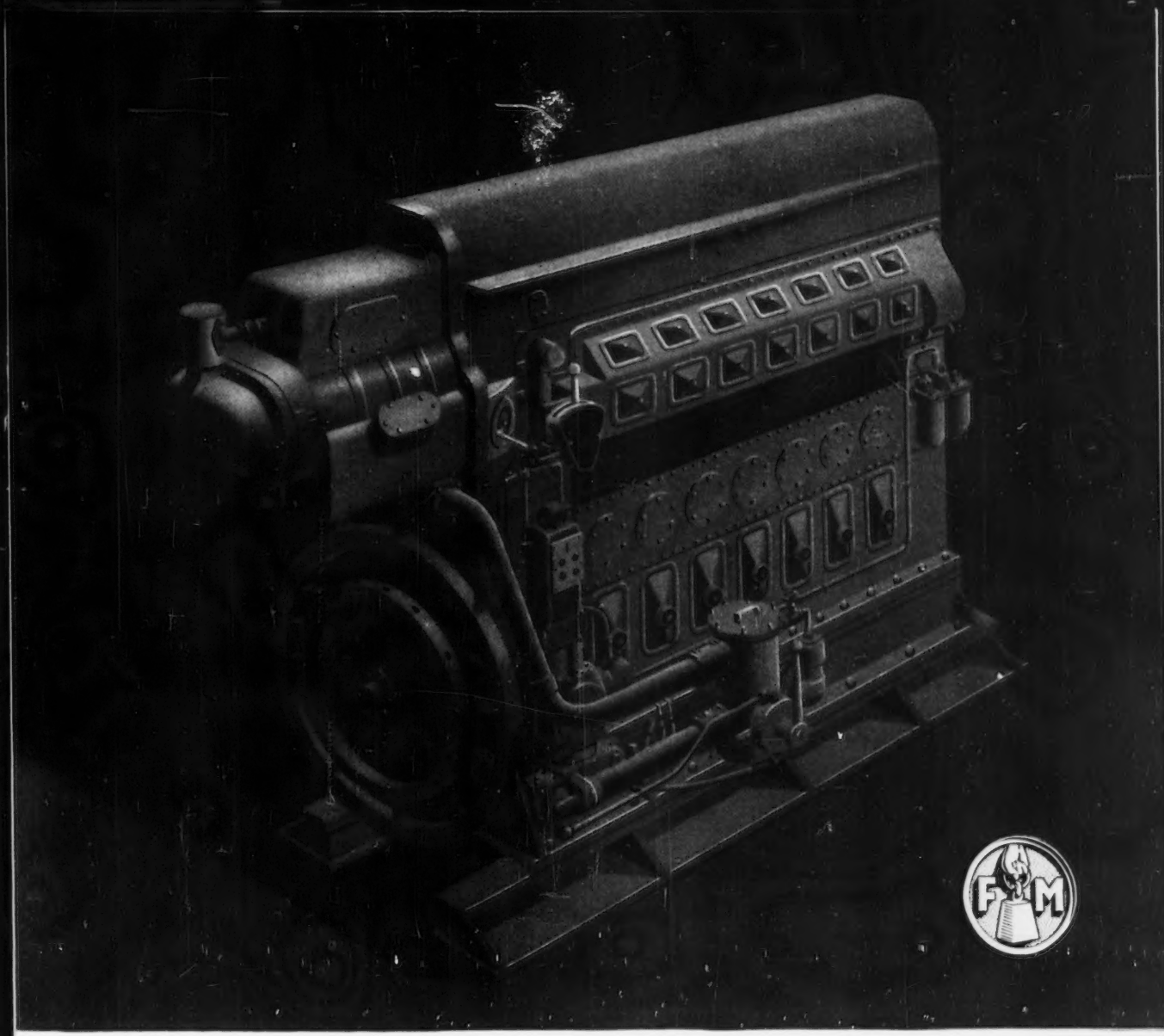
• **Underground development operations** are now under way on the Tor group of claims of Meta Uranium Mines Ltd. on Beaver Island, south of the Eldorado Fay shaft area, in the Beaverlodge mining camp, Lake Athabaska.

• **Seven holes** now have been completed on the Beaverlodge uranium property of Marbenor Malartic Mines Ltd. All holes, spaced 50 ft. apart along the zone, have radioactive sections of similar strength and core length. It is estimated on the basis of outcrops that the structure, now being tested by two diamond drills, may be at least 3,000 ft. long, while the structure shows for approximately 9 mi. on aerial photographs.

NORTHWEST TERRITORIES

• **American Yellowknife Mines** reports that the No. 1 zone on the Beta property at Marian River now has an ore length of 360 ft. Channel sampling in 16 rock trenches averages .326% U_3O_8, or $47.27 per ton over a width of 5.7 ft. Pitchblende, not visible in surface outcrops, is now showing in appreciable quantities in three zones after rock trenching.

• **Continuation of development** work on the uranium properties of Hottah Lake Uraniums Ltd., 80 mi. south of Eldorado Mining and Refining Co., is rapidly extending known radioactive zones. Surface metered geiger exploration has extended the potential uranium vein another 800 ft. north into the Red 8 claim where an exposed pitchblende vein 20 in. wide gave excellent geiger counter readings. The overall picture now indicates three major radioactive showings along the diabase dyke in close proximity to the major fault.



The Fairbanks-Morse Opposed Piston Diesel Model 38F 5¼. 225 to 750 horsepower. Diesel, Dual Fuel and Spark-ignition options. Other O-P engines available in horsepower ratings to 2400.

Some engines are not good enough

Yes, there are some diesels which just do not have what it takes for the job. They cannot satisfy the owner's pride in smooth, trouble-free operation and are lacking in the ability to square a balance sheet of operational costs and profits. For the more difficult jobs, many engines are simply not good enough.

Maybe you should pay more and get more!

If you want more engine-hours with fewer man-hours, *then* you should have the F-M Opposed Piston Diesel which will cost a little more and give you much, *much* more.

Fairbanks, Morse & Co., Chicago 5, Illinois.

FAIRBANKS-MORSE

a name worth remembering when you want the best

DIESEL AND DUAL FUEL ENGINES • DIESEL LOCOMOTIVES • RAIL CARS • ELECTRICAL MACHINERY • PUMPS • SCALES • HOME WATER SERVICE EQUIPMENT • FARM MACHINERY • MAGNETOS

Hauls more - Costs less to run

5 Ton High Type MONITOR

Height — 42" to 48" depending on battery capacity required. Also available in sizes 4 to 12-tons. Track gauge — 16" to 56½".

GREENSBURG STORAGE BATTERY LOCOMOTIVES

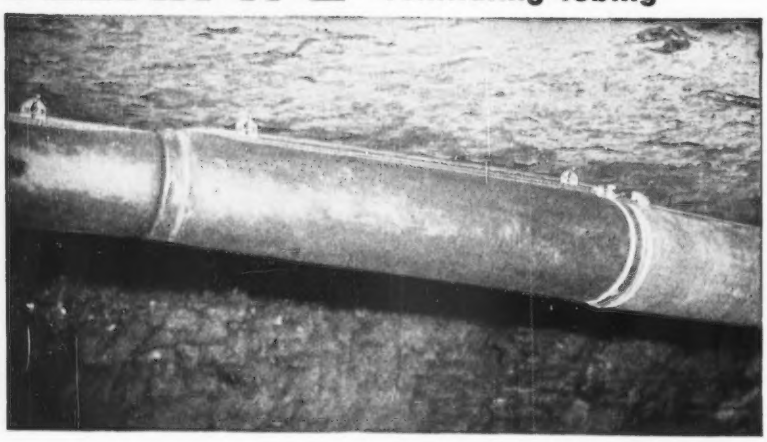
Greensburg Storage Battery Locomotives are custom-built for the job . . . each designed to meet your specific requirements. Built in single or double motor drives with drum or contactor type controllers. Dynamic braking also available. Because of advanced engineering design, Greensburg locomotives have proven themselves up to 20% more efficient and have given longer battery life than any other storage battery locomotive of equal weight and battery capacity. On job after job, you'll find Greensburg locomotives will haul more and cost less to operate.

Write today for details!

GREENSBURG MACHINE CO. 102 STANTON STREET GREENSBURG, PA.

SPECIFY

FLEXIPIPE® the quality ventilating tubing



BEMIS BRO BAG COMPANY

Bemis Bro. Bag Co.

408-E Pine St.,

St. Louis 2, Mo.

Flexipipe is now available with Rope Seam Suspension *at no additional cost.* The newest, best, quickest suspension . . . eliminates special accessories and suspension wires . . . *all you need is a nail.* It equalizes strain on the tubing.

Flexipipe is efficient, serviceable, economical. Jute and heavy-duty grades available in a variety of lengths and diameters to meet your requirements.

Write for complete information and sample.

ALBERTA

• **Goldfields Uranium Mines,** reporting on exploration progress at its recently acquired discovery property at Ray Lake, 100 mi. southwest of the Beaverlodge area, says two diamond drills are now in operation on two of three strongly radioactive zones striking east-west across the property for several hundred feet.

IN AFRICA

• **Uranium deposits** on the southern boundary of Southern Rhodesia, which have been tested by the Atomic Energy Division of the U.K. Geological Survey, have been taken over by a South African mining group. A temporary reservation of 50 sq. mi. has been obtained and a thorough investigation is to be undertaken.

Should these prove satisfactory the first mine producing only radioactive materials in Central Africa will be established. The cost of recovery plant is estimated at not less than $8 million.

• **What appear** to be major deposits of titaniferous ores have been discovered some 40 mi. northeast of East London on the coast of South Africa. Of 63 boreholes put down in a limited area, 60 disclosed high values and three marginal. The main mineral present is ilmenite and preliminary investigations suggest that a deposit extends over some 2,000 acres. A pilot separation plant is being erected.

The Union's first large titaniferous property is due to start up full-scale operations before the end of the year. It is situated to the South of Durban where large deposits of ilmenitic sands exist in hills on the shoreline. They will be washed down to the separation plant by seawater pumped to the tops of the hills.

• **Treatment capacity** of the Tsumeb Corp., South West Africa, flotation plant is being expanded. Two new 9 ft. x 7 ft. ball mills are being added to the mill circuit. One is already in operation and the second should be working by the end of the year. Additional flotation equipment also is being installed to increase the capacity to 50,000 tons a month.

The new De Wet shaft (see page 98) is being sunk to 4,150 ft. It has six compartments and the overall dimension outside the steel sets is 8 ft. 9 in. x 23 ft. 7½ in.

Opening of the 3150 ft. level—750 ft. below the present lowest level—has been started. This level will be a main haulage horizon, with sublevels between it and the present bottom level of 2,390 ft.

• **Rooiberg Minerals Development** Co., South Africa's main producer, is steadily improving its position. In spite of the fall in the price of tin, profits were well maintained over the

SOMEDAY . . . *it will be for real!*

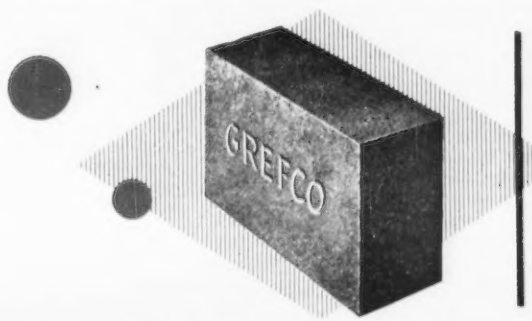
Building with blocks is as much a part of a young boy's life as baseball will be in his teens. Blocks—one on top of the other—to satisfy the typically male urge to create.

As the years roll by, this boy will go on to build bridges or buildings, to make his career in the laboratories of chemical research—or to watch steel being born from ore and earth.

Whatever his future, there will be refractory brick to help him do his job. Blocks of brick to line the furnaces and heat containing vessels—in virtually every step of industry.

There would be no processed raw materials, no production, no living such as we know it but for refractory products which Grefco furnishes in quality and quantity to keep the nation on the move.

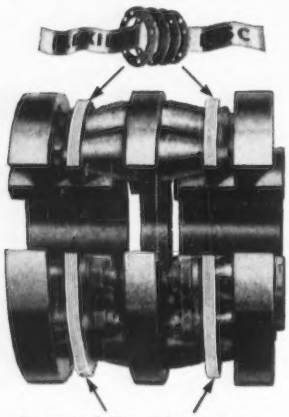
To the boy above, a very Merry Christmas and a great many Happy and Prosperous New Years. In his hands lies the future of America.



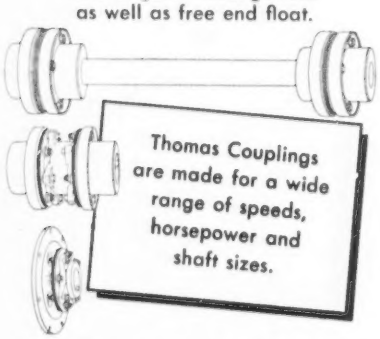
GENERAL REFRACTORIES COMPANY
Philadelphia

Specify THOMAS ALL METAL FLEXIBLE COUPLINGS for Power Transmission to avoid Costly Shut-Downs

DISTINCTIVE ADVANTAGES	
FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut-downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.



Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.



THE THOMAS PRINCIPLE GUARANTEES PERFECT BALANCE UNDER ALL CONDITIONS OF MISALIGNMENT

NO MAINTENANCE PROBLEMS

ALL PARTS ARE SOLIDLY BOLTED TOGETHER

Write for our new Engineering Catalog No. 51

THOMAS FLEXIBLE COUPLING CO.

WARREN, PENNSYLVANIA, U.S.A.

GARDEN ISLAND BAY plant of Freeport Sulphur Co. nears completion in Louisiana marshland at the mouth of the Mississippi River. Plant is said to be the world's largest single sulphur mining development since 1933. Large building (upper center) is the power plant. Some 3-million gallons of water, treated and heated daily by the plant, are then piped to sulphur wells more than a mile away. Sulphur will be shipped in molten form in insulated barges to storage 45 mi. upriver at Port Sulphur. Limited output got underway late last month. At peak output, Garden Island Bay is expected to produce 500,000 long tons of sulphur annually.

Africa *(Continued)*

past year. The fully developed ore reserves rose by 54% and the average value by 16% to 1.66% metallic tin. Extraction efficiency of the plant is improving steadily.

Directors report that the potential production of tin in South Africa (for the first time in history) is in excess of the country's requirements — in spite of a great increase in consumption. In consequence, a start has been made with the export of the company's output in the form of tin concentrates.

● **Speed with** which the Doornfontein Gold Mine on the Far West Rand is being opened exceeds all expectations.

The progress both with underground development and the sinking of No. 1 shaft—largely attributed to the absence of water which has slowed down mines in the area—will bring full production about earlier than estimated.

Original idea was that No. 1 shaft would be ready for hoisting rock in 1957. It should reach this stage by mid-1955.

Crushing of rock from the Annan shaft began officially on Nov. 12 at 40,000 tons a month. It is now estimated that the greater development done justifies provision for a higher milling rate than 48,000 tons a month originally planned. The mine now going ahead to bring the capacity to 100,000 tons as soon as possible.

● **St. Helena Gold Mine,** Orange Free State, was the scene of a gas pocket explosion Nov. 5. Explosion reportedly killed at least eight persons and injured more than 30.

IN LATIN AMERICA

CHILE

● **International Monetary Fund** in Washington has accepted Chile's proposal to alter its rate of exchange from 31 to 110 pesos to the dollar which represents a devaluation of more than 25%, it was reported.

The old rate of 31 pesos was established in 1946. This represents a move towards a uniform rate of exchange and the doing away with the various rates in use which included 31, 43 and 65 pesos to the dollar. Rate of 19.37 pesos at which the American copper companies have to turn in their dollars at the Central Bank to obtain Chilean currency has not been abrogated. It is known, however, that this is one of the main points of discussion in the talks that are taking place in Washington between delegates of the American and Chilean governments on the sale to the U.S. of a stock of 100,000 metric tons of copper which has accumulated.

Probably the income that the Chilean government will lose by giving

Reinsulate with U. S. Uskorona and "D. R." Tapes

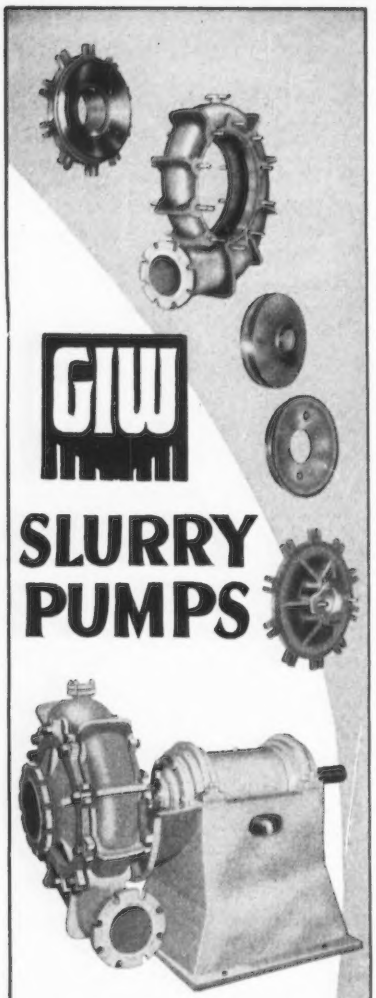
A cable becomes as good as new when you reinsulate with Uskorona and re-jacket with "D.R." splicing compound. The "D.R." compound provides an outside vulcanized covering. These completely reliable tapes give:

- Extra-tight grip plus high tensile strength.
- They stand up under acid, alkalies and moisture . . . ideal for mining machine cables.
- Dangerous leaks can't occur, because pinholes are impossible.
- Absolutely waterproof.

Like all the tapes and splicing compounds in United States Rubber Company's complete line, Uskorona was developed for specific operating conditions, yet can handle a wide range of electrical and general purpose jobs. It exceeds A.S.T.M. specifications. Get in touch with any of our numerous distributors or one of our 25 District Sales Offices, or write to address below.

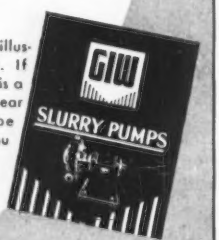
"U.S." Research perfects it
"U.S." Production builds it
U.S. Industry depends on it

UNITED STATES RUBBER COMPANY
MECHANICAL GOODS DIVISION · ROCKEFELLER CENTER, NEW YORK 20, N. Y.



The performance of these pumps is remarkable. Their stamina and efficiency are documented by two years of laboratory and field tests. This is the happy answer to the problem of pumping highly abrasive slurries at high solid concentrations and over a wide range of heads and capacities. Their capacities range from 50 to 8000 GPM against heads up to 150'.

Write for our illustrated booklet. If you wish, there is a representative near you who will be glad to call if you desire.



GEORGIA IRON WORKS CO.
EST. 1901
Marbury Street, Augusta, Ga.

Chile *(Continued)*

the American copper companies the new rate of 110 pesos will make up in a tax that will bring an equivalent amount of money into the Treasury.

No official information whatsover has so far been given in Santiago as to how the talks in Washington are progressing nor about which are the points being discussed or the price asked for or offered for the copper. One dark point in the present outlook for Chilean copper is that the world has been able to get along without it for several months and the price has stayed put at around 29½c.

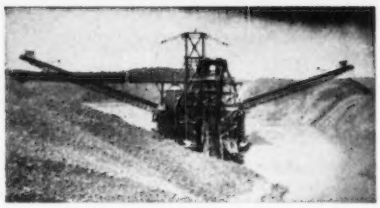
● **Copper is being regularly shipped** again to the United States from the ports of San Antonio, for Braden; Chañaral for Andes and Antofagasta for Chile. Until recently, the copper was being accumulated at the ports. These shipments are a good sign that progress is being made towards a settlement in the buying by the United States Government of the 100,000 tons of Chilean Copper.

● **Mining Bank** has sold another 3000 tons of electrolytic copper to West Germany at 29½c. Since the present rate of exchange for the so-called "German" dollar is 145 pesos, this transaction is more advantageous than selling the copper for 35.5c. at the rate of 110 pesos for the American dollar. Recently the Bank made a sale of 2,500 tons at 35.5c. but only 1,450 tons managed to get away from Hamburg, as the other 1,050 tons were retained by the German authorities at Hamburg since the price of 35.5c. paid for the copper as well as other indications made it almost sure that this copper would find its way ultimately behind the iron curtain from its port of destination: Antwerp. To compensate for the rates of exchange of 145 and 110 pesos between the "German dollar", which is really a barter dollar, and the real dollar, copper would have to be sold at 38.9c. when paid for in "hard" dollars.

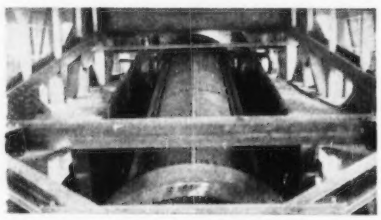
● **Cia. Minera Santa Fé,** one of the new companies formed to exploit the numerous small high-grade iron deposits in Chile, has been importing shovels and other machinery from the United States to reduce costs at its mine.

● **Unions of Chile Exploration Co.** voted in favor of a strike late in October when the company refused to grant wage raises and other benefits which amount to a 2-billion pesos per year. Contract the union had with the other Anaconda-controlled property in Chile, Andes Copper Mining Co., was to expire last month. The two properties employ about 7,500 men.

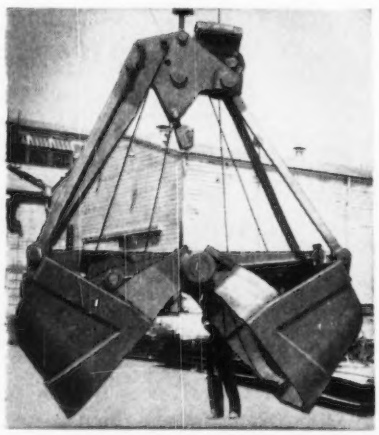
● **Workers and white-collar employees** of two large nitrate plants of Anglo-Lautaro Nitrate Co., Pedro de Valdivia and María Elena continued on strike in late October. Including the Tocopilla railroad and the longshoremen working at the ports of



YUBA Bucket Ladder Dredges for dredging placer properties including rare earths, etc.; handling sand and gravel, dam construction, channel changes, etc., Bucket sizes: 2½ to 18 cu. ft. or larger. Digging depths below water as required.



YUBA Abrasion Resisting Steel Screens—Flat or revolving for separating, scrubbing, sizing. Holes taper drilled to prevent clogging. All thicknesses from ¼" up; other dimensions as needed. U·S·S· AR plate carried in stock.

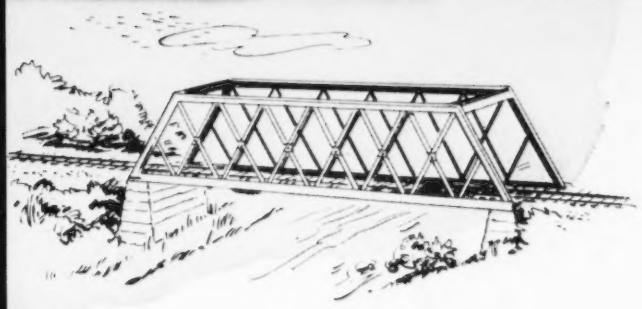


Stockton "Yubabilt" Clamshell Buckets, for channel, harbor and reclamation dredging. Two types: California and Power Arm (shown here). Three weight classes: heavy, standard, special light weight. ½ to 6 cu. yds.

YUBA DREDGES — PROVED DEPENDABILITY ROUND-THE-WORLD

57

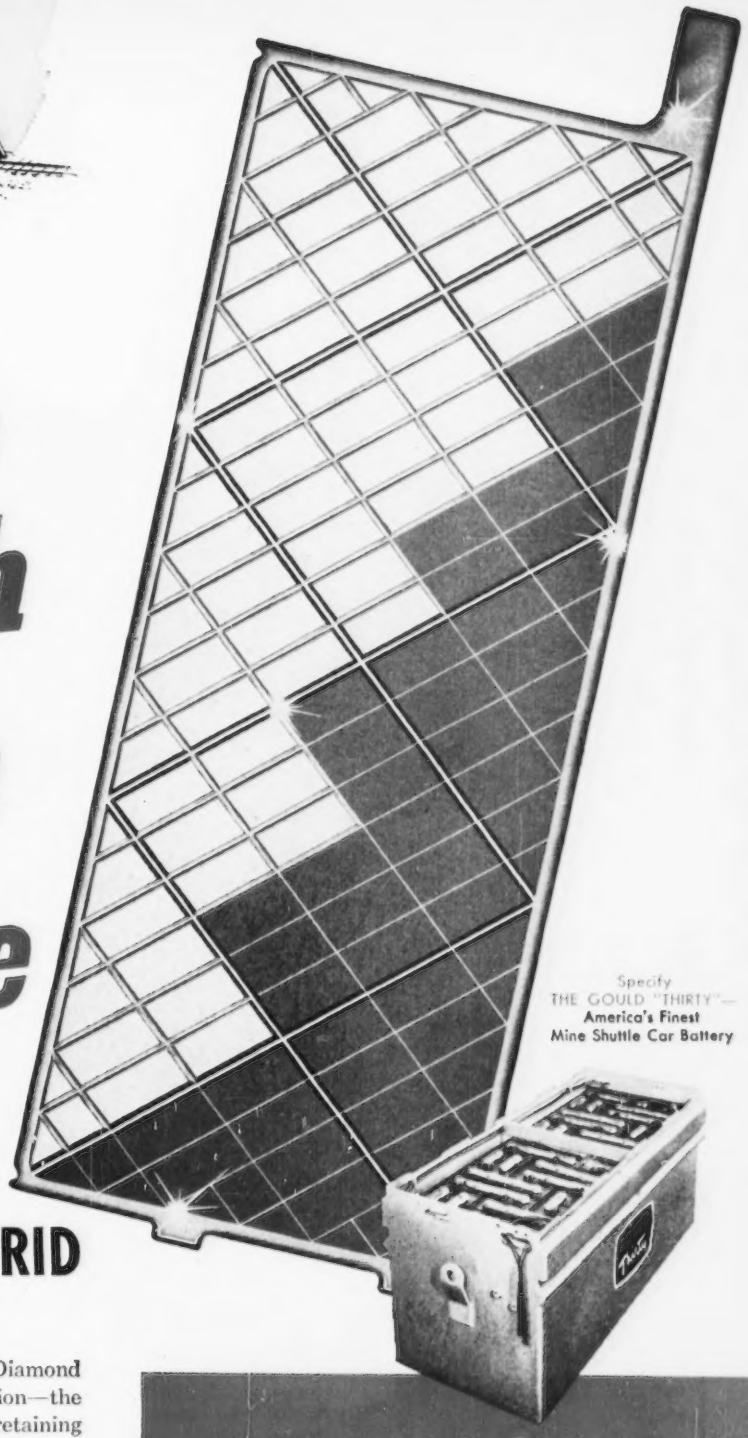
YUBA MANUFACTURING CO.
Room 706 • 351 California St. • San Francisco 4, Calif.



BUILT LIKE A BRIDGE FOR

Rough Tough Service

New GOULD DIAMOND "Z" GRID



Specify
THE GOULD "THIRTY"—
America's Finest
Mine Shuttle Car Battery

LOOK at this illustration of Gould's new Diamond "Z" Grid. See the bridge-type construction—the husky diamond shaped active material retaining members. Note the *extra* large conductive members which not only conduct current to the lug with high efficiency but give still more strength to this most recent achievement of the famous Gould Laboratories.

Here's a grid that's built for rough, tough service, top performance and long life. Years ahead of requirements, it has *extra* strength for every application, *extra* ruggedness to withstand abuse, *extra* ability to deliver full power longer. Now more than ever—when you buy, buy Gould!

© Gould-National Batteries, Inc.

GOULD

INDUSTRIAL BATTERIES

GOULD-NATIONAL BATTERIES, INC.
Trenton 7, N. J.

Always Use Gould-National Automobile and Truck Batteries

BIN STUCK LATELY?

"Here in the mines, stuck coal, ore, granulars, etc., slows down production every day. What can we do?"

"Speed it up by loosening those stuck materials with a Cleveland Vibrator. Fast, economical and versatile."

Catalog No. 109 on request

THE CLEVELAND VIBRATOR COMPANY

2834 Clinton Ave. • Cleveland 13, Ohio

Chile *(Continued)*

Antofagasta and Tocopilla loading nitrate, there are 9,120 workers and 1,840 employees on strike.

• **CORFO (Chilean RFC)** is helping Compañia Minera Bellavista in Central Chile near San Felipe increase production of zinc concentrates. This production together with that from other Chilean mines will be used as part of raw material for making white paint in a new plant being built at San Felipe by CORFO. Manager of the plant and mine is Señor Eugenio Matta, a Chilean mining engineer.

• **Cia Minera Alvasa,** recently incorporated, is exploiting an iron mine 40 mi. from the port of Huasco in Atacama Province. Ore runs 64% iron and is trucked to the port and put on board ships by lighters, an expensive and slow way of doing the work. Mechanization is being considered. So far, about 150,000 tons of ore have been shipped. Mine contains 2.5-million tons of high grade.

• **After a strike** which lasted almost two months, the white-collar employees and workers at the large nitrate plants of María Elena and Pedro de Valdivia have returned to work. The men got a pay raise of 30 pesos per day and other benefits including 22 days wages for every year worked when they retire or are discharged. The benefits obtained by the employees will cost the company 136,000 dollars per year.

PERU

• **Perúvian Congress** was considering a bill to permit exploitation of uranium ores and other radioactive substances by private enterprise. Under the Mining Code now in effect, the exploitation of radioactive substances has been reserved for the State.

On passage of the bill by the Chamber of Deputies—the Senate approved the bill Oct. 15—it is proposed to constitute a control Board of Radioactive Resources. This board will draw up regulations and fix a scale of guaranteed and remunerative prices for the ores or substances which must be sold to the Government for final disposal.

• **Geologists of the U. S. Atomic Energy Commission,** who had been surveying prospective Peruvian uranium deposits during the past three months, returned to the United States last month.

In press interviews, their observations were non-committal, for obvious reasons. That prospects exist is generally known; but so far there is no index to the commercial possibilities. With approval of the amendment to the Mining Code and the drawing up of regulations by the Control Board, there is every reason to believe that there will be a boom in uranium prospecting.

PRECISION RADIATION INSTRUMENTS
TAKES PRIDE IN ANNOUNCING THE
"SCINTILLATOR"*

*Patent Pending

MODEL 111
Portable Scintillation Counter

DEALER INQUIRIES INVITED

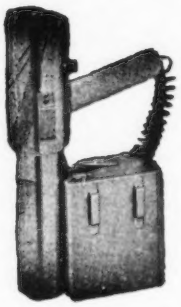
• Made in the U. S. A. by Precision • 100 times the sensitivity of the best Geiger Counter • Suitable for aerial surveys or surveys from moving vehicles • Accuracy within 5% of ¾ full scale reading • Uses latest type RCA 6199 photomultiplier tube • Uses newest simplified circuit • Used by U. S. Geological Survey and the Atomic Energy Commission • Waterproof and tropicalized probe • Weight only 6¼ lbs. Probe 2 lbs. • Only two simple controls • Long battery life • Ranges .025, .05, .25, 1, 5 and 25 MR/HR.

Price complete only **$495.00**

Write for free catalog on the "Scintillator" and our complete line of Geiger Counters and metal locaters.

PRECISION RADIATION INSTRUMENTS
2235EJ South La Brea Ave., Los Angeles 16, Calif.

SCINTILLATION COUNTERS
FIND URANIUM 100 TIMES EASIER



Model 111 (pictured above) . . $495.00
Famous Halross Model 939 . . . 975.00
Airborne Optimum Model SAB-7 . 2810.00

• • • • •

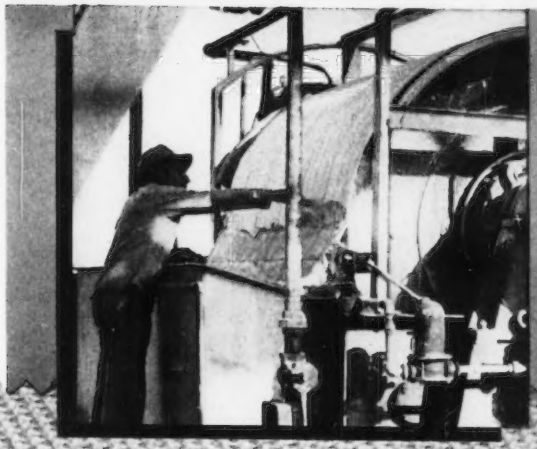
ALL TYPES GEIGER COUNTERS
ULTRA VIOLET LIGHTS
SPECIAL LONG PROBE SCINTILLATION AND GEIGER COUNTERS FOR DRILL HOLES

• • • • •

CARPCO HIGH TENSION AND MAGNETIC SEPARATORS

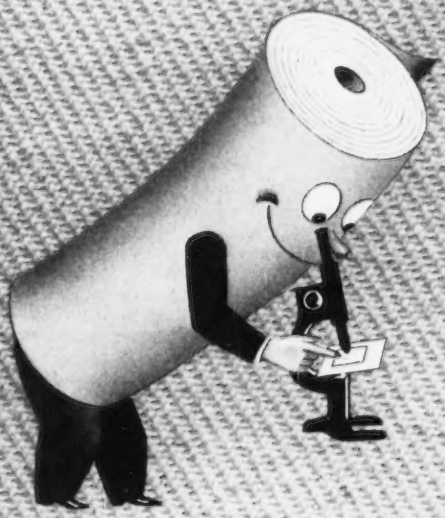
• • • • •

ENGINEERS SYNDICATE, LTD.
5011 Hollywood Boulevard
Hollywood 27, California



UNIFORMITY
Makes The Big Difference In
FILTER FABRICS

MT. VERNON EXTRA
GIVES YOU GREATER FABRIC UNIFORMITY



Determining Yarn Tensile Strength with 300-lb. vertical test. One of a series of comprehensive laboratory controls throughout production to assure uniformity in all Mt. Vernon-Woodberry products.

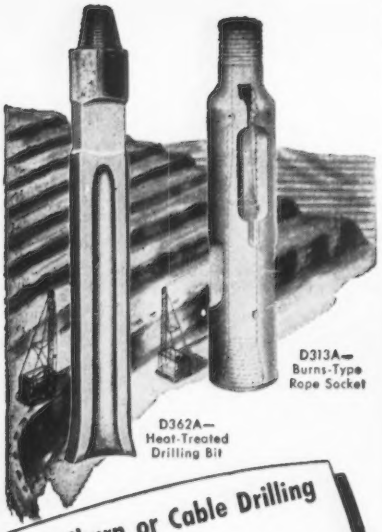
FABRICS ENGINEERED TO FIT YOUR NEEDS

Need adaptation of an existing fabric to your special purposes? Or creation of an entirely NEW fabric — cotton, synthetic or blend — to meet your specifications? Mt. Vernon-Woodberry's staff of textile engineers is available on request to help you with your problems in development or application of industrial fabrics.

Mt. Vernon-Woodberry Mills

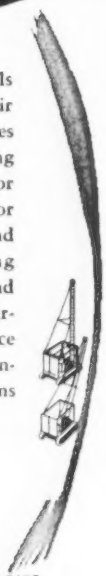
TURNER HALSEY COMPANY
Selling Agents
40 WORTH ST. · NEW YORK

Branch Offices: Chicago • Atlanta
Baltimore • Boston • Los Angeles

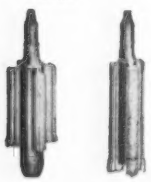


For Churn or Cable Drilling
of
• BLAST HOLES
• PROSPECT HOLES
• SAMPLING
SAFE • EFFICIENT • ECONOMICAL

Spang Churn or Cable Tools are top performers in their fields for drilling test holes when prospecting or sampling . . . drilling blast holes for fragmentation of minerals or overburden . . . drilling and reaming escape, dewatering and ventilating holes . . . and drilling wells for other purposes. Fifty years' experience serving oil, water-well, mining and quarrying operations assures their value.



D606—Reamer-Type
Pilot Bit



LARGE BITS
for pilot hole drilling and stage enlargement reaming of dewatering, ventilation and escape holes.

D370F—Prefabricated
Star Bit

SPANG CABLE TOOLS
made by
SPANG & CO., BUTLER, PA.
for
• SHOT BLAST HOLES • WELL DRILLING
• PROSPECT DRILLING • SAMPLING

SMOKE POURS from a deep open trench mine of the American Gilsonite Co. at Bonanza, Utah, shortly after an explosion Nov. 5. Three men reportedly were injured and several miners were trapped by the explosion and resultant fire. The mine is about 600 ft. deep and about 15 ft. wide. Gilsonite, a solid hydrocarbon, is used extensively in manufacture of battery cases, paints, varnishes and inks. It occurs in virtually pure state in vertical fractures. Veins vary up to 18 ft. in width, more than 1,000 ft. in depth and several miles in length.

MEXICO

• **Knapp Mills of Mexico, S. A.,** a Mexican-American firm, has begun operating a plant in the Federal District which is producing antimonial lead and bismuth-free lead for the first time in Mexico.

The plant is a joint venture of Knapp Mills Inc., Long Island City, New York, and Valezzi Suers., S. A., and De Dominicis, S. A., both of Mexico City.

Knapp Mills is modernizing a Valezzi plant to produce the chemically pure lead, heretofore imported from the United States. De Dominicis, which had been primarily a sheet metal construction company, contributed construction experience and many workers who have been trained by Knapp Mills.

A Knapp Mills official explained that "in accordance with Mexico's current policy of seeking a better balanced partnership of Mexican and American investors, we did not seek to hold the controlling vote. Mexican investors own two-thirds of the shares."

IN AUSTRALIA

• **Uranium fever** "Down Under" shows signs of increasing strength and recent Australian developments should be of major interest to experts throughout the world.

For one thing, new discoveries of uranium deposits have attracted public attention. In South Australia, three new deposits have been discovered in the Crocker's Well area and according to reliable reports, surface indications in two of them are exceptionally good. No detailed examination of these new deposits has taken place but further exploration by diamond drilling is expected to be ordered in the near future.

Two major recent discoveries in the Northern Territory are also being carefully examined in addition to several promising reports of other radio-active areas which have been pin-pointed from the air by the specially-equipped Dakota aircraft.

Coronation Hill deposit, about 50 mi. from Pine Creek, is now the location of diamond drilling but it is not yet certain whether results will be available before the beginning of the wet season. Surface indications are good but at the time of writing they have not been proved at depth.

The other discovery has been named ABC field after geologist A. B. Clarke who found it while making a geological map of the area. The field is situated about 11 mi. from Katherine, where, according to expert geologists, several other deposits will be located in the near future.

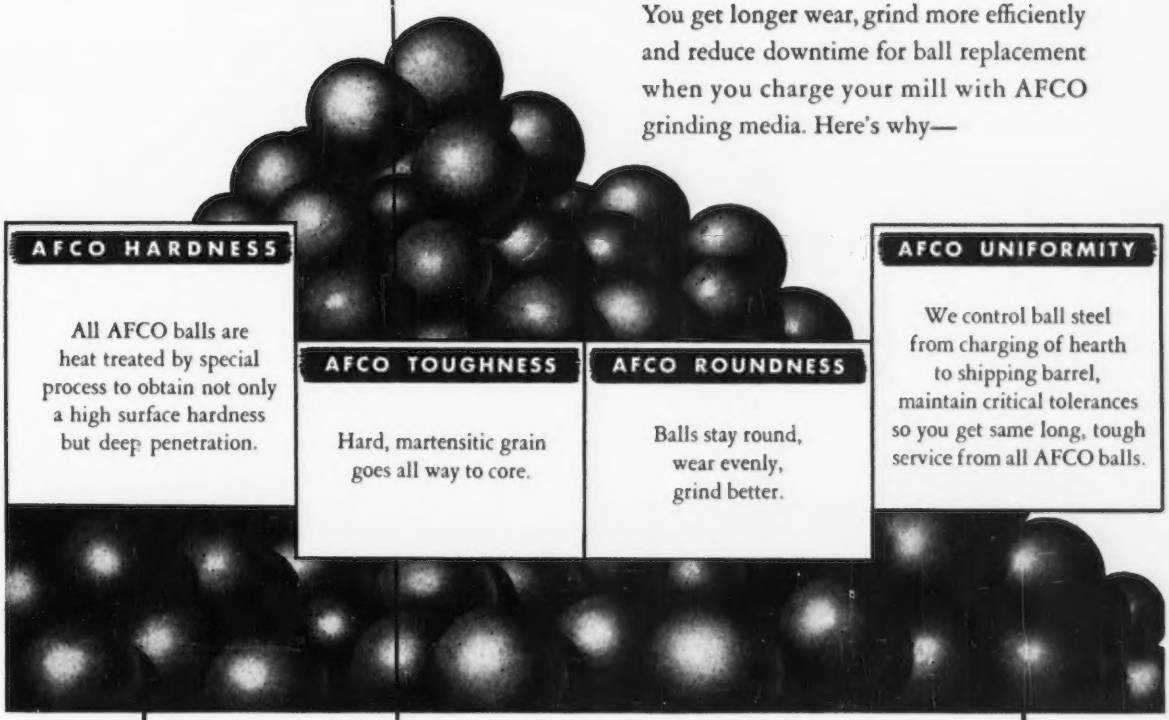
In the meantime, exploitation activities at Rum Jungle field are well under way. The field is at present limited to 168 sq. mi. and uranium ore is being produced from a 30 ft. deep open cut. A shaft has been sunk to about 490 ft. and will soon produce ore and there are also very good and promising developments at Mount Fitch. Considerable quantities of exposed uranium ore are being collected without much effort.

Construction is proceeding at Rum Jungle of a treatment plant to reduce

CUT YOUR GRINDING COSTS WITH AFCO FORGED STEEL BALLS

Choice of Chrome-Moly or Carbon Steel ¾" to 5"

You get longer wear, grind more efficiently and reduce downtime for ball replacement when you charge your mill with AFCO grinding media. Here's why—



AFCO HARDNESS

All AFCO balls are heat treated by special process to obtain not only a high surface hardness but deep penetration.

AFCO TOUGHNESS

Hard, martensitic grain goes all way to core.

AFCO ROUNDNESS

Balls stay round, wear evenly, grind better.

AFCO UNIFORMITY

We control ball steel from charging of hearth to shipping barrel, maintain critical tolerances so you get same long, tough service from all AFCO balls.

see for yourself .....

charge your mill with AFCO balls, compare them with any other ball you've ever used. Write, wire or phone NOW for prices.

AMERICAN FORGE COMPANY

Executive offices and plant: **Niles, California . . . Phone Niles 3311**

Sales offices: 101 Park Ave., New York City; Portland, Oregon; Los Angeles, Calif.; Salt Lake City, Utah.

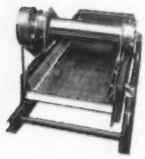
"AFCO" PRODUCTS

water won't loiter with round rod screens

Your dewatering operation will speed up . . . become more dependable . . . with Bee-Zee Screens. Their exclusive round rod design offers no hospitality to H_2O. Water has no place to loiter—it must keep rolling downward where it belongs, instead of lurking in your coal where it can cause expensive winter freeze-ups in your coal cars.

SCREENS LINGER LONGER, TOO—You'll get added months of performance from Bee-Zee Screens . . . greater length of time between costly shutdowns for installation—again, thanks to round rod design. That's because accuracy of screening remains ●● until screens are worn halfway ◡◡ through!

FIT ANY COAL PROCESSING EQUIPMENT—Whatever your screening job, Bee-Zee Screens can be designed and built to solve your problem and make you money! Send us your requirements. No obligation.



Write for free catalog

BIXBY-ZIMMER Engineering Co.

573 ABINGDON STREET, GALESBURG, ILLINOIS

BEE-ZEE SCREENS CAN BE FITTED TO ANY SCREENING EQUIPMENT

Australia *(Continued)*

the crude ore to uranium oxide concentrate. It should come into operation in the second part of 1954. About 500 persons are at present employed in difficult climatic conditions but more will be enlisted in the not too distant future.

In South Australia, the State-owned Port Pirie uranium treatment works are expected to come into operation about June 1954 with an output of high grade uranium salt for subsequent smelting. A $250,000 pipeline will be constructed to supply water from River Murray to Port Pirie works.

At the same time the Federal Australian Government is intensifying efforts to stimulate private prospecting for uranium. Before the end of 1953, the Australian Atomic Energy Commission will survey all results of exploration and is expected to formulate a definite policy on prospecting and exploitation of uranium resources. In the meantime, prospecting and mining uranium will be as easy for individuals and firms as are similar activities in regard to other metals.

All mined ore must be sold to the Government. Several gold companies have decided to enter this field and a number of new companies and syndicates have been formed for this purpose.

Government has now allowed exploration of the aboriginal reserves in the Northern Territory, where geologists are expecting major discoveries.

● **First uranium discovery by a public company** in the Northern Territory was announced Nov. 2 by the Director of Mines at Darwin.

He said that this was also the first find of uranium since the Northern Territory Legislative Council gave companies and individual prospectors the right to mine for uranium.

The new field is at Brock's Creek, 130 mi. south of Darwin. It is a mile from the main north-south highway, and 60 mi. from the Territory's first major uranium field at Rum Jungle.

It is understood that the company will be granted a temporary mining reserve over the area. The new discovery was made by a geologist, on behalf of the company. He was advised to investigate the Brock's Creek district by a former mines inspector who considered that its geological structure indicated the presence of uranium ore.

IN EUROPE

YUGOSLAVIA

● **A Japanese mining engineer** flew to Belgrade last month on a United Nations Technical Assistance Administration assignment to Yugo-

WEIGH WITHOUT STOPPING WHILE YOU CONVEY

Yes, weigh and record with the —MERRICK WEIGHTOMETER

The Merrick Weightometer provides a continuous, automatic, accurate weight record at any designated point in the mill, while material is in motion on conveyor. It weighs without interrupting conveyor service. Applicable to any size belt conveyor, horizontal or inclined. An accurate and dependable means of keeping constant check on production.

MERRICK SCALE MFG. CO. PASSAIC N. J.

Kleenslot VIBRATOR SCREENS

They can be DESIGNED AND ADAPTED TO FIT ANY MAKE OF VIBRATOR. Perfect separation on wet or dry screening. Accurate performance on hundreds of installations.

HERE'S HOW IT'S DONE

Cross section at left shows how KLEENSLOT Screens operate on a non-clogging principle.

Kleenslot SCREEN GUARDS

The screen guard is built into the screen and the guard bars permit only the finer particles to pass over the screen. All sizes and most materials furnished.

SEND FOR OUR ILLUSTRATED LITERATURE

Wedge-Wire CORPORATION

5602 CLARK AVE. CLEVELAND 2 OHIO

SHARONSTEEL reduces operating costs with 6 thrifty BALDWINS

The use of six continuously operating Baldwin-Westinghouse diesel switching locomotives by the Sharon Steel Corporation at their Roemer Works reduced operating costs. Here is Sharon Steel's report:

- "We have found that operating costs are lower with the Baldwin-Westinghouse diesels than they were with steam locomotives.

"There is a reduction in operating delay at each turn change time, because refueling and resanding is done only once every three days. Formerly, we took on water, coal, sand and cleaned the fires at each turn change.

"The installation of diesel locomotives has been a large step forward in our air purification program. The elimination of smoke and dirt produced by the steam locomotives entering buildings has greatly improved working conditions. Another improved feature over steam locomotives is the ability of the Baldwin diesel to rapidly generate more air pressure for our air dumped cars."

If *you* are interested in cutting *your* operating costs, write now for Bulletin DMH-300, to Dept. 1646, Baldwin-Lima-Hamilton Corporation, Philadelphia 42, Pa.

BALDWIN BLH LIMA-HAMILTON

BALDWIN-LIMA-HAMILTON

INDUSTRIAL LOCOMOTIVES

...they're thrifty!

Designed for the Environment
BULLFROG and SKOOKUM SLUSHER BLOCK

So perfectly fitted to his environment is the bullfrog that for millions of years he has survived the rigors of evolution, the ravages of his enemies. He is at home in water, mud or on dry land. He can survive extreme heat and bitter cold. He is a perfect example of perfect design for a rugged environment...*as is the Skookum Slusher Block*. Here is a block designed to perform flawlessly in water, muck and silt without down-time. It's rugged, non-wearing, non-fouling. It's the exclusive choice of more and more mine operators.

THE SKOOKUM COMPANY, INC.
8504 N. CRAWFORD STREET • PORTLAND 3, OREGON

Skookum Slusher Block No. 208-SH with patented bearing seal.

Yugoslavia *(Continued)*

slavia where he will advise the Government on the mining and processing of large copper ore deposits recently explored in Majdanpek, Eastern Serbia.

Yugoslavia is today the largest copper producer in Europe, exclusive of Russia. The Majdanpek deposits are located in an area which was the site of old pyrites and copper workings and which is only some 25 mi. away from the Bor Mines, currently one of the major producers in the country.

The Yugoslav Government states that recent explorations in the Majdanpek area revealed that the deposits have a proven reserve of about 80-million tons of ore containing about 0.9% copper, 3.0% magnetite and some 0.5 to 0.8 grams of gold per ton. The bulk of the ore consists of "chalcopyrite" or copper pyrites.

Plans for exploiting this body of ore have been prepared by the Government in cooperation with the Engineering Department of the nearby Bor Mines. Indications are that the Majdanpek deposits are suitable for open-pit mining although it is possible that underground mining may prove more economical.

The United Nations expert is Hidesaburo Kurushima, a graduate of Kyushu Imperial University, who is well known for the revolutionary changes in copper smelting methods he introduced to Japan with the adoption of Dorr's FluoSolid System. He will advise the authorities on both mining and processing operations, including details of the plans drawn up, the general lay-out of plants, mining and transportation methods to be used, the selection of appropriate machinery and other related problems.

GREECE

● **Iron pyrite** ore is now being produced in Greece at the rate of 260,000 tons per year, according to press reports in Athens. This compares with annual production figures of 244,000 tons in 1938, and 181,263 tons in 1951. Between 180,000 and 200,000 tons of the ore are exported each year, bringing in foreign exchange to the value of some $2.7-million.

The most important mines are those at Cassandra and Hermioni; all other deposits discovered so far are very limited in extent.

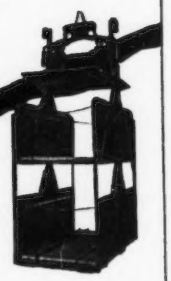
PORTUGAL

● A decree recently passed in Lisbon authorizes the setting up of an iron mining and smelting corporation with capital exclusively Portugese. The corporation is to employ about 300 European workers. First furnace is

(Continued on page 182)

CONNELLSVILLE
(LEPLEY)
Safe MINING EQUIPMENT

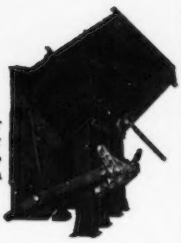
Economical-Rugged!



MAN CAGES
Single or double deck types. Capacities from 1 to 90 men.

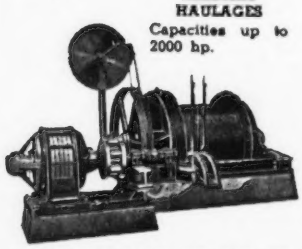
BOTTOM DISCHARGE SKIPS
Built to "take it" in 1 to 25 ton capacities.

SKIP LOADING CHUTES
Operated either by skips or air cylinders. Toggle locked when closed.



SHEAVES
Bicycle type with renewable special steel liners. Up to 16 ft. dia. with plain or anti-friction bearings.

ELECTRIC HAULAGES
Capacities up to 2000 hp.

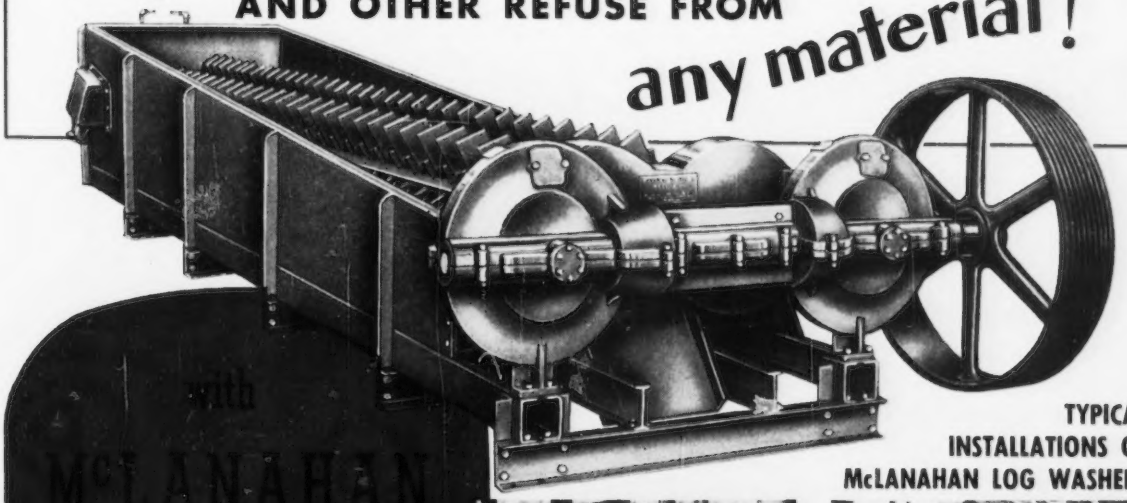


WRITE FOR COMPLETE DETAILS

We specialize in all types of equipment to meet your needs

CONNELLSVILLE
MFG. & MINE SUPPLY CO.
CONNELLSVILLE, PA.
"Serving the Mining Industry Since 1901"

Remove TOUGH CLAY, SOFT ROCK AND OTHER REFUSE FROM any material!



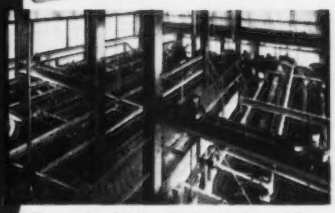
with

McLANAHAN LOG WASHERS

McLanahan Welded Steel Log Washers are smooth running, highly efficient machines for removing tough clays, soft rock and other materials from iron and manganese ores, barytes, zinc, ochre, peat, limestone, trap rock, sand and gravel, phosphate, gold and other ores. These machines remove up to 90% of refuse materials—providing savings that more than pay for the installation in a short time. A few of hundreds of applications are illustrated at right.

Write today for Bulletin WLO 849

TYPICAL INSTALLATIONS OF McLANAHAN LOG WASHERS

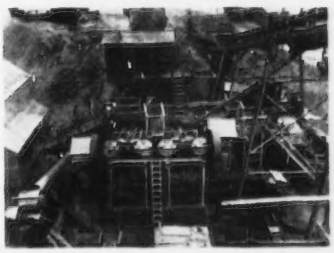


Three pairs of McLanahan Logs in the world's largest phosphate plant in Florida.

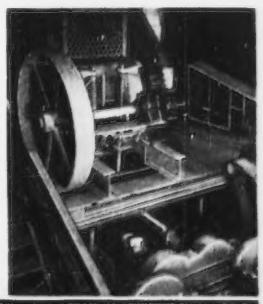
New and old type McLanahan Log Washers used here remove clay from cement rock in Pennsylvania.

McLanahan Log Washers removing tough clays from gold ores in Alaska.

McLanahan Paddle Mill and Log Washer cleaning Texas limestone.



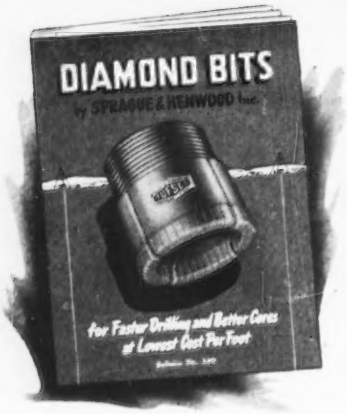
Two pairs of 30' McLanahan Logs, used for cleaning sand and gravel in Virginia.



McLanahan Rockmaster Crusher and Log Washer removing tough clays from iron ore in Alabama.

McLANAHAN & STONE CORPORATION
Pit, Mine and Quarry Equipment Headquarters
Hollidaysburg, Pennsylvania

Dependable Products: **Single and Double Roll—and Jaw Crushers, Crushing Plants, Reciprocating Plate and Apron Feeders, Roll Grizzlies, Conveyors, Elevators, Screens, Scrubbers, Steel Log Washers, Sand Drags, Hoists, Jigs, Dry Pans, Dryers, Scrap Bundlers, Pulleys, Gears, Bearings, Sprockets, Sheaves, Rollers, Bin Gates, Elevator Buckets, Gratings, Car Wheels, Ferrous and Bronze Castings.**



"ORIENTED" DIAMONDS

Make Sprague & Henwood Bits

CUT FASTER— LAST LONGER

Always a leader in its field, Sprague & Henwood, Inc. PIONEERED the development of ORIENTED Diamond Bits; in which each individual diamond is set with its hardest rib or "vector" toward the work.

As of the present date we have produced more than FIVE THOUSAND oriented bits, in a wide variety of types and sizes, with both cast and powdered-metal matrices; and have proved, by extensive comparative tests in our own contract drilling operations, that they cut much faster and last much longer than bits in which the diamonds are set at random.

Only selected diamonds of certain crystalline structure can be used and only specially trained and equipped setters of more than usual aptitude can be relied upon to orient diamonds correctly in the mold, but we are now fully organized for efficient production of ORIENTED DIAMOND BITS, at no additional cost to the purchaser.

In terms of footage cost, these are the most economical diamond bits ever produced and we invite inquiries on that basis. Bulletin No. 320 illustrates and describes all types and gives complete working data.

CONTRACT DRILLING

We do drilling by contract and are one of the oldest and largest contractors for any type of core drilling. Experienced crews are available on short notice for service anywhere in the United States and many foreign countries. Estimates submitted promptly on request.

Sprague & Henwood, Inc.
SCRANTON 2, PA.

Branch Offices: New York, Philadelphia, Pittsburgh, Grand Junction, Colo., Buchans, Newfoundland

DMEA Further Restricts Supports For Exploration For Vital Metals Program

A FURTHER RESTRICTION of the DMEA program of exploration support was announced last month by Interior Secretary Douglas McKay. The regulations under which DMEA helped finance the cost of exploration for new deposits of strategic minerals were amended in accordance with recommendations by ODM, made when the former agency requested additional funds to continue the program to June 30, 1954.

The new amendment also reduces the maximum percentage of government participation in approved costs of any exploration project from 90% to 75%.

Under the new amendment (No. 3), assistance is now available for the following metals and minerals:

Group A: Chromium, copper and molybdenum, for which the government will contribute 50% of the approved project costs;

Group B: Asbestos (chrysotile only), beryl, cobalt, columbium, manganese, mica (muscovite block and film only), nickel, platinum, tantalum, tungsten and uranium, for which the government will contribute 75% of approved costs.

Practical effect of the revision, according to McKay, may be summarized as:

- Elimination of crocidolite and amosite types of asbestos, refractory grade bauxite, industrial diamonds and thorium from the list of minerals previously eligible for assistance;

- Shifting of all remaining commodities heretofore eligible for 90% government participation into the 75% category, which group previously included only manganese and tungsten. McKay pointed out that all applications received after Nov. 3, 1953, which request participation for metals and minerals listed under Group B, will suffer the reduction.

C. O. Mittendorf, DMEA administrator, reported to the Secretary that during the four-month period ending Oct. 30, only three applications had been received for the now-ineligible crocidolite, amosite, refractory-grade bauxite, industrial diamonds and thorium, and that 48% of the applications for the same period were for minerals previously at the 90% level, now reduced to 75%.

Unneeded Imports Endanger Lead-Zinc Industry, Fletcher Tells 'International Mining Days' Meeting

ANDREW FLETCHER, president of St. Joseph Lead Co. and of AIME, declared that unneeded imports are endangering the domestic lead-zinc industry and called for tariff protection.

Fletcher gave this warning before the "International Mining Days" meeting in El Paso, October 28-31. This was similar to a statement Fletcher made at the American Mining Congress convention at Seattle (*EM&J*, October 1953, p. 130).

"The domestic lead-zinc industry is in danger of being swamped by unneeded imports of those metals," Fletcher told the 500 delegates to the "Mining Days" gathering.

He said that "it is up to the present Congress to protect our mining industry" and suggested "a sliding scale tax or tariff to keep the United States lead-zinc industry from being shut down."

To back up his contention, Fletcher cited estimated United States consumption of 1,172,000 tons of zinc this year, pointing out that the domestic industry would supply 620,000 tons, leaving an import requirement of 451,000 tons.

Actual imports, however, Fletcher added, probably will be 678,000 tons—an excess of 317,000 tons.

He placed the "unneeded" import figure for lead at 249,000 tons.

Other meeting highlights included:

FLETCHER

- Reelection of W. Page Morris, resident manager, Duval Sulphur & Potash Co., Carlsbad, as president of the New Mexico Mining Association.
- Forum on technology of copper, lead, zinc, fluorspar, uranium, potash, perlite, manganese and pumice mining, moderated by W. H. Goodrich Hurley, New Mexico manager, Chino Mines Div., Kennecott Copper Corp.
- Visits to the Carlsbad Caverns and to U. S. Potash Co. mines.

THE GREATEST SHOWING OF INDUSTRIAL RUBBER PRODUCTS ON EARTH
REPUBLIC RUBBER
CHAMPION-SAFETY
SUPER SERVICE AIR DRILL
YOUNGSTOWN, OHIO
1. Special Reprene tube compounded to resist the action of hot oil from compressors, and designed to provide a glass-smooth channel for more efficient air delivery.
2. Chemically treated, rubber-impregnated braided yarn provides increased burst strength and suppleness.
3. Elastic rubber layers promote greater flexibility and prevent chafing of the braided plies.
4. Tough, yellow "Sure-Grip" safety cover resists impact, abrasion and aging.

When you need "The Best"

. . . that's where Republic's Champion Air Hose fits into **your** picture.

Built to really "take it," Champion will last longer and give better service on the really tough operations.

And . . . if your operation doesn't demand a really "super" hose, there's a "right" Republic Air Hose for you . . . a hose especially designed and built to do the specific job for which it's intended.

Ask your local Republic Rubber Distributor for help in selecting Industrial Rubber Products. If his name is not listed in the yellow pages of your telephone directory, write directly to us.

REPUBLIC RUBBER DIVISION

LEE RUBBER & TIRE CORPORATION, YOUNGSTOWN 1, OHIO

INDUSTRIAL RUBBER PRODUCTS

STEEL

Prompt Shipment . . .

Our stocks of Certified Quality Steel are large and becoming more complete. Quick, dependable service is assured

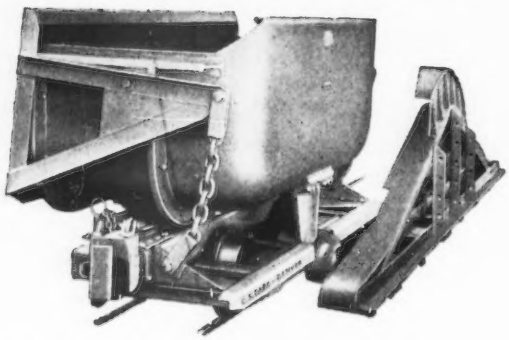
Plates, Structurals, Bars, Sheets, Tubes, etc. . . . Carbon, Alloy and Stainless Steels . . .

RYERSON

Joseph T. Ryerson & Son, Inc. Plants: New York, Boston, Philadelphia, Detroit, Cincinnati, Cleveland, Pittsburgh, Buffalo, Chicago, Milwaukee, St. Louis, Los Angeles, San Francisco, Seattle, Spokane

Lower Mine Haulage Costs

are in the CARDS



Card cars are available engineered to your individual requirements. Before you settle on misfit equipment because it's "standard," let us quote on your *exact* needs. On the basis of cost per ton-mile haul, *Card* equipment saves you money.

Our 60th year of service to the mining industry

C.S. Card Iron Works Co.

2501 WEST 16TH AVE.
DENVER, COLORADO

Portugal *(Continued)*

expected to begin operation around the end of this year.

Plans call for annual production of 10,000 tons of raw ingot iron and 20,000 tons of processed iron products.

The new law clearly distinguishes three groups of mining rights. First group of rights can be exercised by any owner of land but only for magnesite, kaolin, clay and quartz. Second group, the "Federal" rights, includes salt, which is a state monopoly. Third group includes all remaining available minerals. Owners of land must permit accredited companies to extract mining deposits against a set, nation-wide fee.

Since the draft law was introduced by the two-party government, which boasts a majority in both houses, approval of the law seemed assured.

IN ASIA

MALAYA

● **A 100-million** Straits dollars undertaking to tap iron ore deposits in East Pahang, Central Malaya—is to be undertaken by the locally-registered and British-owned Eastern Mining & Metals Company Ltd.

A company spokesman said that negotiations were in progress in London for British banks to finance the project. The newspaper Straits Times named the banks as the Chartered Bank of India, Australia and China and the Hongkong and Shanghai Banking Corp.

Prospecting in the hilly country has been going on for more than two years. Results so far show more than 25-million tons of high-grade iron ore deposited in the area, which is near Kampong Kuala Aur about 50 mi. west of Kuala Merchong—between Rivers Jeram and Rompin.

The Company plans to spend about 30-million Straits dollars on a 50-mi. railway from the mine to the sea.

By 1956 the mine, which will employ up to 3,000 workers, is expected to be in full production. The ore will be shipped to Britain, Japan and the United States.

The Company has leased about 2,000 acres from the Pahang Government and hopes eventually to secure leases on 9,000 acres.

JAPAN

● **Mitsubishi Metal Mining Company of Japan** has signed a contract to purchase copper concentrates from the Atlas Consolidated Mining and Development Corp. of the Philippines over a three year period, according to a spokesman of the Japanese firm. Th contract involves an advance pay-

(Continued on page 186)

USED TO DESTRUCTION...NO RESHARPENING

Liddicoat

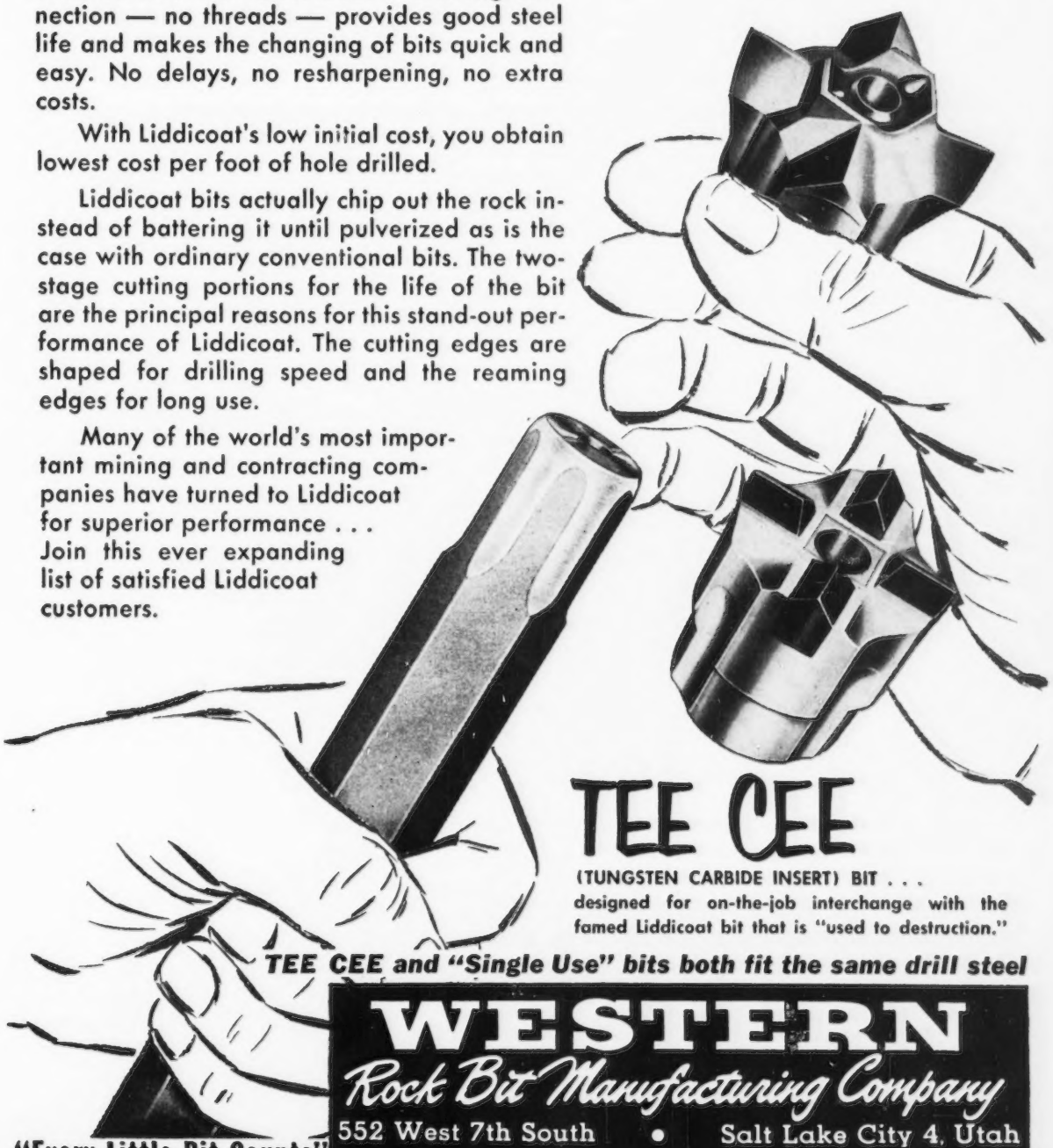
...the bit that drills farther, faster, for less

Liddicoat detachable bits are used to destruction and then discarded. The strong connection — no threads — provides good steel life and makes the changing of bits quick and easy. No delays, no resharpening, no extra costs.

With Liddicoat's low initial cost, you obtain lowest cost per foot of hole drilled.

Liddicoat bits actually chip out the rock instead of battering it until pulverized as is the case with ordinary conventional bits. The two-stage cutting portions for the life of the bit are the principal reasons for this stand-out performance of Liddicoat. The cutting edges are shaped for drilling speed and the reaming edges for long use.

Many of the world's most important mining and contracting companies have turned to Liddicoat for superior performance . . . Join this ever expanding list of satisfied Liddicoat customers.



TEE CEE

(TUNGSTEN CARBIDE INSERT) BIT . . . designed for on-the-job interchange with the famed Liddicoat bit that is "used to destruction."

TEE CEE and "Single Use" bits both fit the same drill steel

"Every Little Bit Counts"

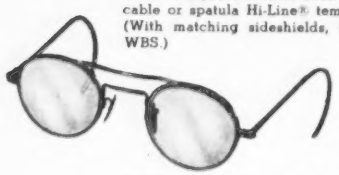
WESTERN
Rock Bit Manufacturing Company
552 West 7th South • Salt Lake City 4, Utah

WILLSON
SAFETY SPECTACLES

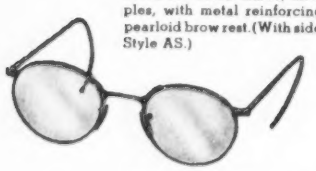
Everything you want in

- PROTECTION
- COMFORT
- STYLE

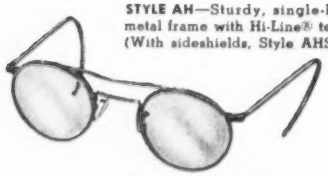
STYLE WB—Bronze-color, non-flammable butyrate frame. Standard cable or spatula Hi-Line® temples. (With matching sideshields, Style WBS.)



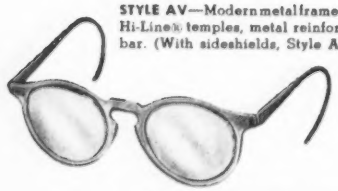
STYLE A—Metal frame, on-line temples, with metal reinforcing bar or pearloid brow rest.(With sideshields, Style AS.)



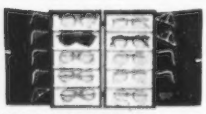
STYLE AH—Sturdy, single-bridge metal frame with Hi-Line® temples. (With sideshields, Style AHS.)



STYLE AV—Modern metal frame with Hi-Line® temples, metal reinforcing bar. (With sideshields, Style AVS.)



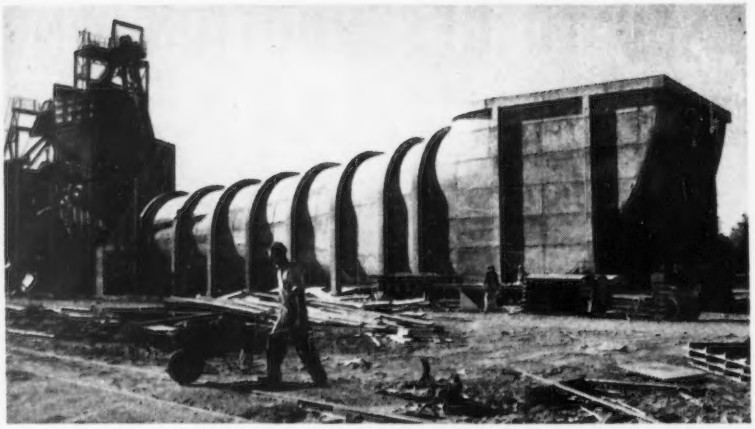
STYLE WK—Flesh-color butyrate frame with spatula or half-plastic, half-cable temples.(With sideshields, Style WKS.)



ASK YOUR WILLSON DISTRIBUTOR to show you the Willson Sample Kit of Safety Spectacles which includes lenses, frames and sideshields available.

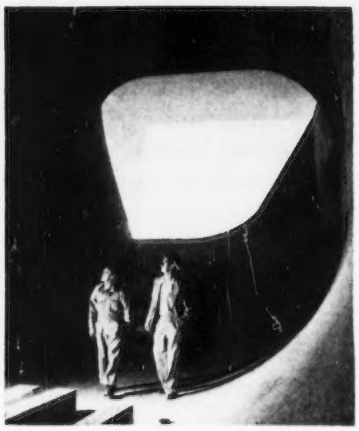
More than 300 Safety Products — Carry This Famous Trademark
WILLSON
Established 1870

WILLSON PRODUCTS, INC.
225 Washington Street, Reading, Pa.



World's Largest Fan

LARGEST axial flow air fan in the world has been installed on the Broken Hill silver, lead and zinc mining field, 700 mi. west of Sydney, New South Wales. Fan, with its carriage, weighs more than 42 tons. It will provide the sole ventilation for underground workings of New Broken Hill Consolidated and the Zinc Corp. Air is drawn up a shaft 3,000 ft. deep at 43 mph, then expanded and slowed down through a 32-ft. long evasee of reinforced concrete (shown right). Trumpet-shaped exhaust of the evasee has a maximum diameter of 28 ft.



President Eisenhower Appoints Committee To Revise National Metals Mining Policy

PRESIDENT EISENHOWER last month called for a new policy which would both protect mine expansion and assure the nation enough minerals to see it through "the uncertain years ahead."

Noting depressed conditions in some mining areas, the President established a four-member Cabinet committee to recommend a new national policy. (*See p. 101*).

McKay Is Chairman

He named Secretary of the Interior McKay chairman of the committee and designated Secretary of State Dulles, Secretary of Commerce Weeks and Defense Mobilization Director Flemming as the other members.

In a letter to McKay, President Eisenhower said "depressed conditions within numerous metal mining districts" are "a matter of grave national concern." The Chief Executive added:

"The mining industry has contributed in large measure to our present state of preparedness through vigorous expansion of its facilities. Every effort should be made to preserve this new added economic strength through policies that would be consistent with our other national and international policies."

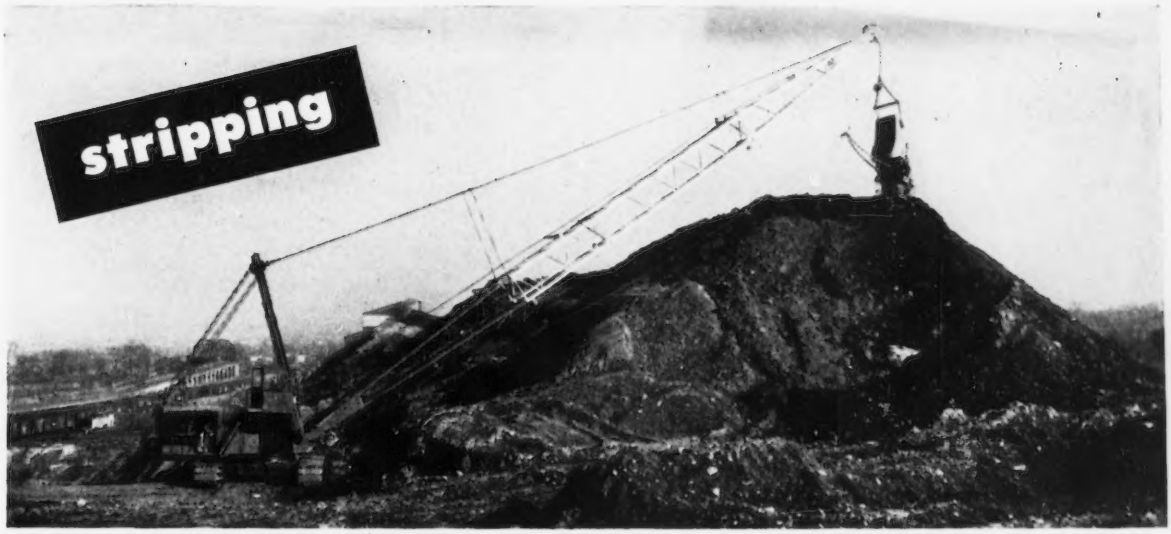
In addition, President Eisenhower said:

"The prudent use and development of domestic mineral resources, as well as assured access to necessary sources abroad, are indispensable to the operation of an active economy and a sound defense.

"We must make sure as Americans, that we have available mineral raw materials adequate to meet any contingency during the uncertain years ahead.

Study Deadline

The Chief Executive said it would be helpful if the committee could complete its study by next March 31, the deadline set by the Senate Finance Committee and the House Ways and Means Committee for the U. S. Tariff Commission to complete a separate study of the lead and zinc industries, with special reference to imports of these two metals, it was reported.



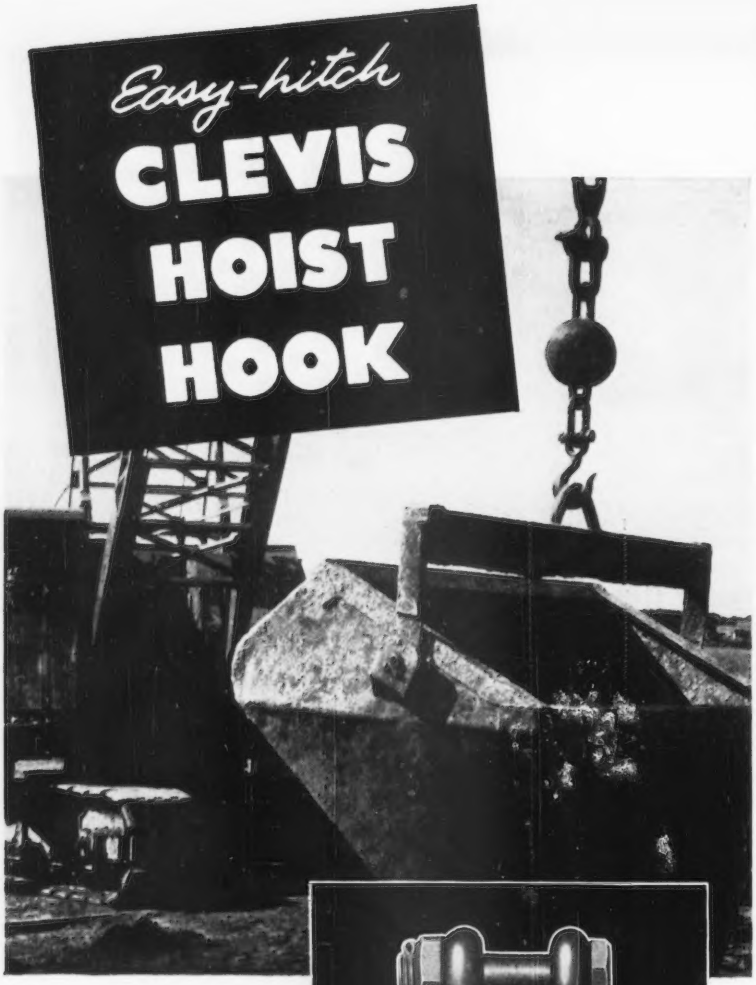
The Big Swing is to MANITOWOC

There's a big swing to mighty Manitowocs all through the mining industry — a big replacement trend as more and more operators, after studying costs and production figures, switch to Manitowoc.

You'll find Manitowocs ideally suited to your job too, because they're specially designed for mining. You'll find features no other excavator can match size for size — extra long hi-lift shovel booms for loading and stripping — extra long dragline booms with big bucket capacity for long reach and big yardage — long crawler lengths for maximum stability and flotation — more power on the bucket because of main machinery simplicity — and the exclusive TORQUE CONVERTER DRIVE which adds extra yardage and faster production on every cycle.

Ask the Manitowoc owners in your vicinity — check for yourself — find out why the big swing is to Manitowoc. Manitowoc Engineering Corp., Manitowoc, Wisconsin.

MANITOWOC
SHOVELS 1-5 YD. Speedcrane CRANES 18-100 TON



Here's the hook you've always wished for. A Clevis Hoist hook with a heat treated hex head bolt, check nut and cotter. It can be installed or removed in a jiffy. And it's made only by Laughlin.

Available in four safe working load sizes: 1.5, 2.1, 3.1 and 5 tons. Drop forged and heat treated. Order them from your supply house.

LAUGHLIN

THE THOMAS LAUGHLIN CO.
126 Fore St., Portland, Maine

Japan *(Continued)*

ment of $750,000 by Mitsubishi in the form of equipment to be used in developing the copper mines.

● **In little more than a year,** Japan's titanium production has grown from a few pounds in a young metallurgist's pilot plant to a new industry's monthly output of 10.75 tons.

Manufacturers claim they will produce 200 tons per month by the end of 1954, and 1,000 tons before 1958.

Leading producer is Osaka Titanium Co., jointly owned by Sumitomo Metals Co., Kobe Steel Co., and Furukawa Electric Industry Co., who bought out the Ishizuka family's Osaka Special Steel Co. last year. Young Hiroshi Ishizuka discovered the chloridation method by which titanium is extracted from sand iron slag and built the pilot plant.

Osaka Titanium produces six tons per month and plans to boost production to 55 tons next year. Other companies in current production are Japan Electric Metallurgy Co., Nippon Soda Co., and Mitsui Metal Mining Co., all of which are planning for ten to thirty tons monthly next year.

● **Japanese zinc producers** will increase monthly output by 200-500 tons from late this year or early next year, according to a spokesman of the Japan Mining Association.

He said the average monthly output of zinc, now at 7,000 tons, would be raised to 7,200 or 7,500 tons in the next three or four months. It might be boosted even to 8,000 tons by April.

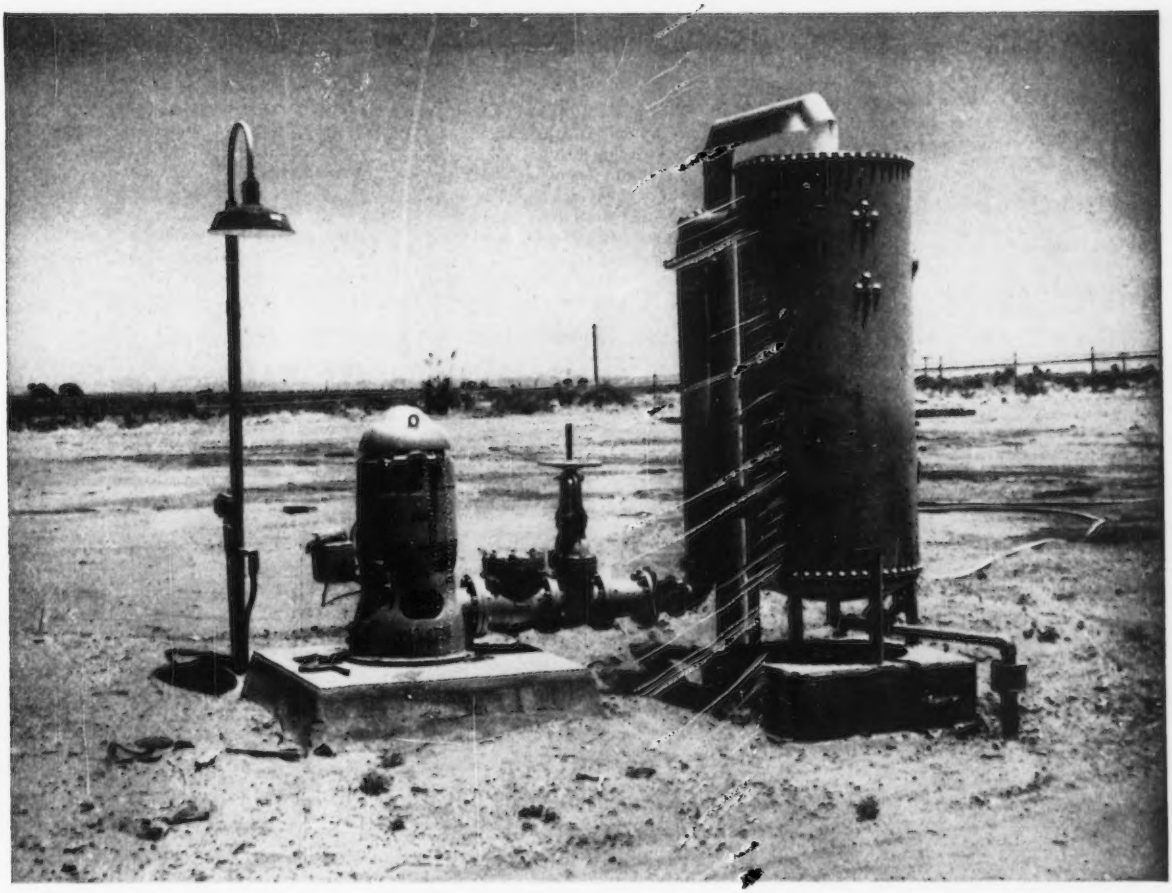
Three new plants which have a monthly capacity of 550 tons of electrolytic zinc, 1,500 tons of distilled zinc and 450 tons distilled zinc respectively are being completed. The spokeman said, however, the projected monthly output of 1,500 tons would not be realized due to lack of electric power.

IN THE PHILIPPINES

● **U. S. Bureau of Mines** Region No. 3 Director Stephen M. Shelton is en route to the Philippine Islands to make a survey for possible site of a laboratory similar to the U. S. electro-metallurgical facility at Albany. Before leaving, Shelton reported he may also be assigned to a similar mission to southern Africa. The Philippine trip is being undertaken for the U. S. Foreign Operations Administration.

● **Work is moving ahead rapidly** on the Atlas project, formerly known as Toledo Copper in Cebu. Equipment from the dismantled Masbate mill is arriving daily. A 4,200-kw steam

Critical Jobs Are Routine For Johnston Pumps!



...TAKE THIS FLOATATION MILL JOB FOR EXAMPLE:

Located outdoors on the steaming hot desert near Hanover, New Mexico, two Johnston Turbine Pumps supply water from deep wells for plant operations, sanitation and human consumption at a 400 ton floatation mill.

In selecting the pumps for this job there were 3 primary conditions: first, the units had to be field-proven for high sustained efficiencies; second, shut-down time for maintenance had to be cut to the bone; third, controls had to be located a considerable distance from the pumps. Johnston not only met all these requirements, but surpassed them!!!

Here are the specifications of the 2 units supplied: 30 H.P., 6 stage, vitriform enameled bowls, bronze closed impellers, oil lubricated column, 300 G.P.M. capacity against a 260 foot head.

This is just another example of the ability of Johnston equipment to handle all kinds of pumping jobs. For the kind of pump "know-how" that puts money in the bank, see your Johnston Dealer, or ask a factory representative to call. They're always glad to help.

Send for your copy of "Water— Where You Want It . . . When You Want It". Ask for Bulletin E-123.

JOHNSTON VERTICAL PUMPS

JOHNSTON PUMP COMPANY

3272 EAST FOOTHILL BLVD., PASADENA 19, CALIFORNIA

Philippines *(Continued)*

plant is due to arrive in December from Japan. Most of the equipment needed is available from Masbate aside from one 4-ft. Symons cone and additional flotation cells.

Orders for new machinery will be principally placed in Japan as Mitsubishi has advanced a large loan to help to finance the mill. While mill completion was scheduled for mid-1954, it appears unlikely that the job can be completed before 1955 because of delays in obtaining import and exchange permits. George T. Scholey is chief engineer for the Atlas Mining & Development Co.

● **Japanese steel interests** are vigorously scouting the Philippines for high grade low sulphur iron ore. The ore they are presently receiving averages about 56% Fe and 0.8% Sulphur, with some showing sulphur as high as 3-5%.

Much of the Marinduque iron ore is highly pyritized, and the sulphur appears to increase with depth. At the Agusan iron mine in Paracale official sampling shows 63% iron and 3.5 sulphur. According to the report of a Japanese engineer, the Philippines have enough iron ore to supply the future needs of the Japanese steel industry.

● **Reports were being circulated** that rich deposits of chromite have been found in the Irawan Mountains 15 mi. from Puerto Princesa on the island of Palawan. It is claimed to be the highest grade of chromite yet found in the Philippines.

Another report has it that marketable quantities of molybdenum have been found in Tayasan, Oriental Negros and the Philippine consulate in New York has been officially notified to contact American firms interested in buying the ore. Rumors that uranium has been found appear to be without foundation and a survey team headed by an American geologist has returned to the United States.

Hayes P&M ONE PASS DETACHABLE BITS

EMBODYING WATERLAND AND PADLEY & MORGAN PATENTS

FOR LOW COST DRILLING

Patented features of the Hayes P&M Bit retard shoulder wear and reversing of gauge angle. The result is a bit with far longer useful life and lower cost operation. These features are proved both in tests, and in actual practice in the field. We will gladly demonstrate under your conditions, against any competing product.

- SIMPLEST CONNECTION
- OFFSET GAUGE
- FLATTENED POINTS
- THINNER WINGS
- 3 OR 4 WING TYPES

- Simplest Connection
- Offset Gauge
- Flattened Points
- Thinner Wings
- 3 or 4 Wing Types

HAYES STEEL PRODUCTS LIMITED
MERRITTON, ONTARIO, CANADA

Detachable Drill Bits — Grinding Balls — Mining Equipment
Transmission, Pole Line, Marine & Industrial Hardware
Universal Joints — Front & Rear Axles — Clutches
Forgings — Stampings — Machining

IN THE NEAR EAST

LEBANON

● **A company** has been formed in Lebanon to prospect for gold and other metals. Authorities in Beirut reportedly are considering placing metallurgical products under government control.

SYRIA

● **Geological prospectors** have discovered iron in some districts of Syria. According to scientific sources, the iron discovered is suitable for exploitation on a commercial scale. Metallurgical missions are expected to be invited from abroad for the technical study of the iron and its exploitation, it was reported in Damascus.

IN SCANDINAVIA

SWEDEN

● **Swedish geologists** have made what they consider remarkable finds of copper and zinc during their continued research last summer in the provinces of Norrbotten and Vaesterbotten and in the Jaemtland mountains in North Sweden.

Ore containing over 7.5% of copper has been found in the state mining area of Stekenjokk near Vilhelmina.

On the whole, over 200 new ore blocks have been found near Vilhelmina and the area near the border of the province of Jaemtland and Swedish Lapland. About half of them have revealed rich copper and zinc contents.

● **Last year** Sweden exported more iron ore than ever before—15.7-million tons, representing a value of 865-million kronor ($167-million)—and the industry is now expanding in preparation for future increases.

HAZACORD BULLETIN

HAZARD INSULATED WIRE WORKS • DIVISION OF THE OKONITE COMPANY, WILKES-BARRE, PA.

NEW SHUTTLE-CAR CABLE CONSTRUCTION PUTS "HEX" ON STRAIN..INTERNAL ROTATION..FATIGUE

New, Improved Grounding Conductor Gives HEX-TITE Added Flexibility

Hazacord HEX-TITE Type G, provides extra workability and flexibility in grounded cables. The grounding conductor is composed of many more fine wires protected by a cotton serving that forms a smooth channel through which the ground wire can work.

Special Lubricated Strand

Hazard's processing of the grounding strand permits the conductor to work freely without wear or danger of breakage of the strands. This added workability of the grounding conductor permits sharp bending of the cable without fatigue.

HEX-TITE Conductors Provide Exceptional Heat Resistance

Hazard Performite Heat-Resisting Insulation is used in all HEX-TITE Cable. It is suitable for operating temperatures as high as 75C. It provides a safety margin of about 25% to withstand overload surges.

New Hazacord HEX-TITE Twin Shuttle-Car Cable Promises Longer Lived, Lower Cost Trailing Cable Operation

Resisting internal twisting and slippage, new Hazacord HEX-TITE Twin Cable sets a new standard for trailing cable. Hexagonal insulated conductors provide six plane surfaces to form an extra strong mechanical bond with the protective Hazaprene ZBF Sheath. An open reinforcing braid over the hex-insulation is an additional guard against excessive pulling and dislocation.

Special Adhesive Bond

Hex-insulation in the new Hazacord HEX-TITE is treated with a strong adhesive bonding agent for further resistance to slippage within the sheath. Yet, this adhesive permits removal of the sheath for splicing and repair without tearing or damage to the conductor.

Hazard representatives throughout the mining areas have complete information on new HEX-TITE Twin Shuttle-Car Cable. You can also write Hazard Insulated Wire Works, Division of The Okonite Company, Wilkes-Barre, Pennsylvania.

Tough, Hazaprene ZBF Sheath First with Mine Operators

For real protection, new Hazacord HEX-TITE has the famous Hazaprene ZBF Sheath. It offers superior resistance to flame, oil, acid and mechanical damage. And this sheath is pressure-vulcanized in a continuous metal mold for a smooth, dense surface that resists abrasion and tearing. Proof of mold curing is the full description and official approval number P-104BM embossed in raised letters in the sheath.

Prevents Shorting

The rugged Hazaprene Sheath completely encases each hex-conductor, providing a barrier between power conductors and between power and grounding conductor on Type G. This protective wall prevents shorting when the cable is run over and compressed.

Diamond Core Drilling

Mineral Exploration

Foundation-Test Drilling

Grouting

More than 15 years experience with trained crews.
Estimates on request.

Tinney Drilling Company
113 W. Main St.
Grafton, W. Va.
Phone 130

Letters (*Continued from page 4*)

there previously and had dropped the work." This, in reference to the Geological Survey's work in Klukwan, I believe to be a misstatement. Dr. E. C. Robertson (Harvard geologist) was completing dip-needle surveys of higher grade portions of the deposit as the final field work on a project that had been started in 1950, while he was a full-time geologist with USGS, and continued until the present.

C. L. SAINSBURY,
USGS, Juneau, Alaska

Ray Mine Horsepower

SIR:

An item in the October issue of *E&MJ* (p.140, Arizona) regarding state taxation at the Ray Copper Mine reminds me that about 55 years ago I personally located nine mining claims to cover the Ray orebody.

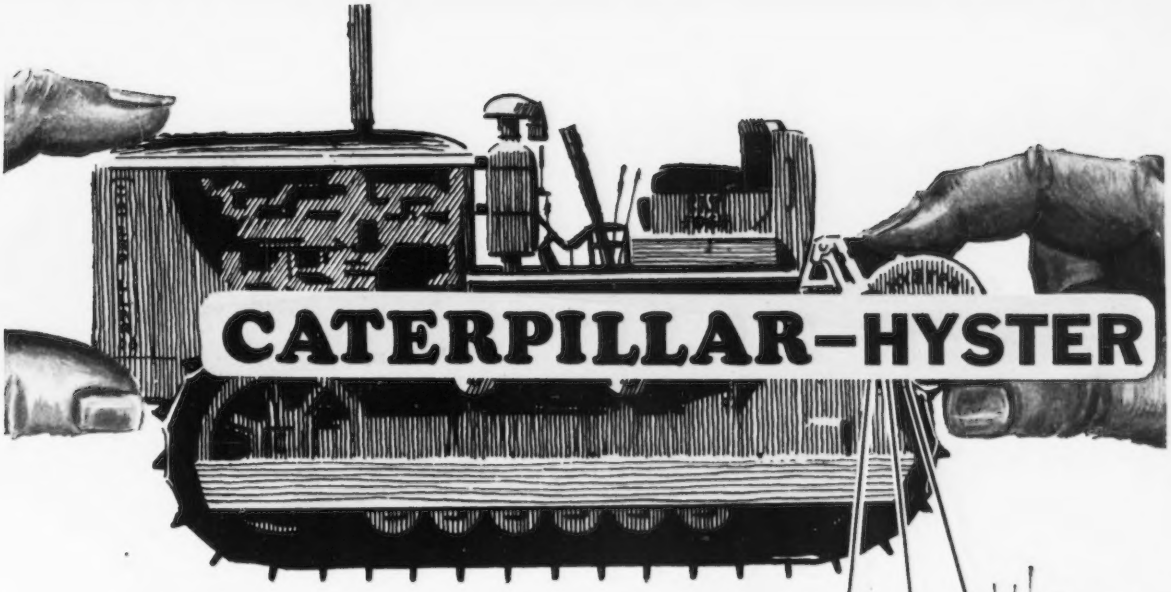
I contracted this shaft work at $6 per ft. by hand drilling, but I furnished the lumber and horse. (See picture above.)

MURRAY INNES
San Diego, Calif.

No need to dig and take out twice the width of a tunnel when a single track will do the job more economically. The "Canton" loads entire train on the single track. This famous economy device can be installed on any track or gauge and rail now in use. Its operation is simplicity itself . . . pushing empty car on truck by locomotive then moved by hand to transfer section, permitting locomotive and cars to pass. Train is pulled out all at one time. Two men in two minutes can take down, to move the three units to new location when desired . . . no alterations required for track or rails. Timken Roller Bearings enable easy shunting of heavy cars to maximum weight of six tons. The Car Transfer speeds up loading, hauling, saves expensive double-tracking. Write for complete literature; please use street and zone numbers.

American Mine Door Co.
2039 Dueber Avenue
Canton 6, Ohio

Manufacturers of "Dustributors" • Automatic Switch Throwers • Automatic Mine Doors • Mechanical Track Cleaners



...the RIGHT MATCH in equipment that is your assurance of greater tractor productivity!

For nearly a quarter century, owners of Caterpillar-built tractors have looked to Caterpillar-Hyster Dealers for the *ideas* and *properly-matched equipment* that increase tractor *productivity*.

Today, over 700 Caterpillar-Hyster Dealer stores around the world bring you the *right* tractor equipment for your job plus the two big advantages that Caterpillar-Hyster offers:

"MATCHED DESIGN," the result of close co-operation between Caterpillar and Hyster engineers, which assures the proper operation of the tractor and attached equipment *as one unit*.

"PACKAGED" EQUIPMENT, which brings you *all* the right equipment on ONE order—plus the advantages of dealing with ONE service for all your needs, such as *one* financial plan, *one* source of parts and service, *one* source for ideas on product application.

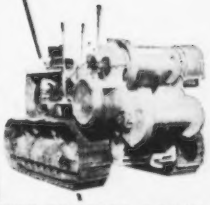
For information or literature helpful to your job, see your Caterpillar-Hyster dealer or write:

HYSTER COMPANY

2965 N. E. CLACKAMAS STREET.....PORTLAND 8, OREGON
1865 N. ADAMS STREET.....PEORIA 1, ILLINOIS

Hyster, Hystaway, Tractor Donkey, Sulky, are registered trademarks.

HYSTER WINCHES 19 types and sizes for every application—in construction, mining, logging and manufacturing industries.



HYSTER TRACTOR DONKEY and YARDERS—hoists for all types of pulling and hoisting jobs.

HYSTER GRID ROLLER—the basis of a revolutionary new road rebuilding method which salvages all the old bituminous material, also compacts base, rolls surface.

HYSTER LOGGING SULKY and ARCHES for increasing log production.

HYSTAWAY EXCAVATOR-CRANE—mounts on used or new tractors... convertible to shovel, backhoe, dragline, clamshell, crane, piledriver, *plus bulldozer!*

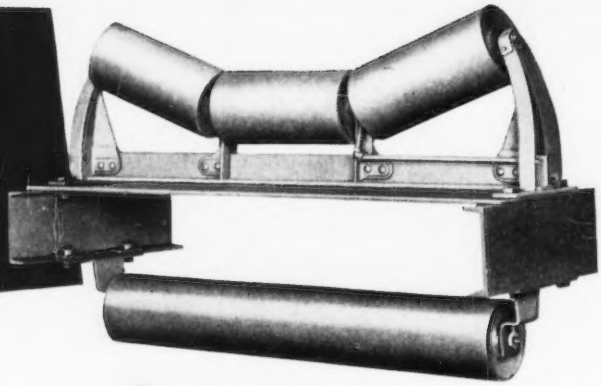
Wherever you are ... there is a Caterpillar-Hyster Dealer near you

THERE'S PROFIT IN HYSTER POWER

HYSTER

HYSTER COMPANY • PORTLAND, OREGON; PEORIA, ILLINOIS; NIJMEGEN, THE NETHERLANDS

LINK-BELT IDLERS



...the long-life answer to higher belt conveyor efficiency

WHEN your materials move on Link-Belt roller bearing idlers, you're assured of free-rolling efficiency. And because friction loss is minimized, they require less power to operate. You'll like their low maintenance, too. Grease-in-dirt-out seals preserve lubricant. Dozens of other design features promote long life.

Choose from a full line of 20° and 45° troughing idlers in a variety of styles. Belt-training and flat belt idlers are also furnished in a wide range of roll diameters and belt widths. See your nearby Link-Belt sales representative or distributor for new Book 2416.

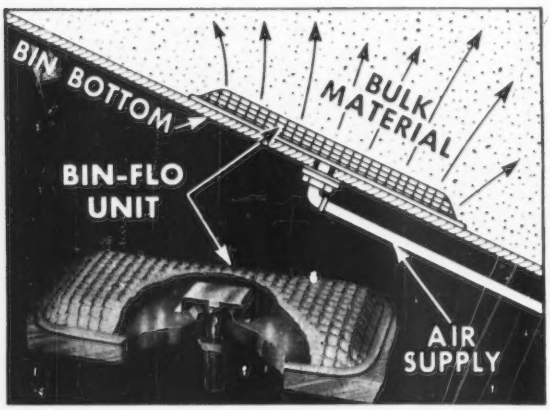
LINK-BELT COMPANY: Chicago 9, Indianapolis 6, Philadelphia 40, Atlanta, Houston 1, Minneapolis 5, Duluth 2, San Francisco 24, Los Angeles 33, Seattle 4, Toronto 8, Springs (South Africa), Sydney (Australia). Sales Offices, Factory Stores and Distributors in Principal Cities. 13,219

Series "100" troughed rubber cushion idler.

Series "100" troughed belt-training idler, positive action type.

LINK-BELT

ROLLER BEARING IDLERS



BIN-FLO

USES SMALL VOLUME OF AIR AT LOW PRESSURE

KEEPS BULK MATERIALS MOVING

BIN-FLO units in bins, chutes, hoppers, etc., restore flow characteristics to dry, finely ground materials which tend to pack or bridge in storage. Types for all materials and conditions. No moving parts; simple installation; negligible operating cost; no maintenance cost.

BIN-DICATOR bin level indicator—"The Eyes of the Bin"—automatically reports levels of materials in storage; automatically controls filling machines; prevents waste.

NEW 20-PAGE BOOK FREE

THE BIN-DICATOR CO.

13946-R1 Kercheval • Detroit 15, Mich.

If there is

something you want . . .

that other readers of this paper can supply

or —

something you don't want . . .

that other readers can use, advertise it in the

SEARCHLIGHT SECTION

(Classified Columns)
of this paper

CORE DRILLING

"We look into the Earth"

—anywhere!

- Mineral Prospecting
- Foundation Test Borings and Grouting
- Large diameter holes for Ventilation and Escapeways

PENNSYLVANIA Drilling CO.

DRILLING CONTRACTORS & MFRS.

1205 Chartiers Ave. **PITTSBURGH, PA.** WAlnut 1-5816

BIG LOADS RIDE EASY ON A *Mack's* BROAD SHOULDERS

It will pay you to find out what Mack six-wheel trucks can do to save money and boost profits on your job through unfaltering traction and faster, uninterrupted schedules.

That's because only Mack six-wheelers boast the unique advantages of Mack's exclusive Balanced Bogie and Power Divider . . . with all the benefits they give you in maximum flexibility, even tire loading, uniform braking, simplicity of design and positive traction regardless of the toughest terrain.

Write to us today for your free copy of booklet describing the Mack Balanced Bogie with Power Divider, or contact your nearest Mack branch or distributor.

Mack TRUCKS

. . . outlast them all

Mack Trucks, Empire State Building, New York 1, N. Y. Factory branches and distributors in all principal cities for service and parts. In Canada: Mack Trucks of Canada, Ltd.

Professional Services

ASSAYING
CONSULTING
PROSPECTING
ORE TESTING

RESEARCH
METALLURGY
MILL DESIGN
MINE MANAGEMENT

BEHRE DOLBEAR & COMPANY

Consulting Mining Engineers and Geologists

11 Broadway, New York 4, N. Y.

CALL IN A SPECIALIST TO SOLVE THAT PROBLEM

Experiment takes time—so why not save time by calling in a specialist who has already gone over the ground you are now exploring?

Engineering & Mining Journal, meeting place of mining men in all parts of the country, points the way to the solution of many milling problems through its Professional Service Section.

Why not tell one of these specialists about YOUR problems?

BLANDFORD C. BURGESS
Consulting Engineer
Industrial Mineral Specialist
Appraisals Mineral Surveys
Plant Design
Prospecting Development—Efficiency
Ground Water Studies
Box 350 Monticello, Ga.

KELLOGG KREBS
Metallurgical Engineer
Mineral Dressing Consultant
564 Market St. Telephone:
San Francisco 4, Calif. SUtter 1-6613

AMEDEE A. PEUGNET
Consulting Mining Engineer
Telephone MAin 1431
705 Chestnut St., St. Louis 1, Mo.

MARVIN J. UDY
Inorganic Chemistry Electrochemistry
Electric Furnace Smelting
Process Metallurgy
Ferro-Alloys, Calcium Carbide, Phosphorus
Telephone 2-6294
546 Portage Rd. Niagara Falls, N. Y.

DICKINSON LABORATORIES
Assayers—Chemists—Metallurgists—Umpire Work
Ore Shippers Representatives at Local Plants
Samplers - Analysts at Mexican Border Points
1300 West Main St. El Paso, Texas

LEDOUX & COMPANY, Inc.
Metallurgical Chemists — Assayers
Spectroscopists
Samplers—Weighers
Representatives of Shippers of Ores and metals at Buyers Works
Office and Laboratories
359 Alfred Ave., Teaneck, N. J.

ROGER V. PIERCE
Mining Engineer Specialist
Underground Mining Methods. Cost Cutting Surveys—Production Analysis
Mine Mechanization—Mine Management.
1596 Wasatch Dr., Salt Lake City, Utah

WALKER & WHITE, Inc.
Umpire, Assayers, Chemists
Shippers Representatives
409 Pearl St. New York City

ABBOT A. HANKS, INC.
ASSAYERS—CHEMISTS
Est. 1866
Spectrographic Analysis
Shippers Representative
624 Sacramento Street
San Francisco 11

ROBERT S. MAYO
Civil Engineer
Complete Equipment for Concrete Lining of Tunnels, Haulageways and Shafts. Special Equipment for Underground or Subaqueous Construction.
Lancaster, Penna.

LUCIUS PITKIN INC.
Mineralogists—Assayers
Chemists—Spectroscopists
SHIPPERS REPRESENTATIVES
Main Office—Laboratories
Pitkin Bldg.—17 Fulton St.
New York 7, N. Y.

WEISS GEOPHYSICAL CORP.
Mining geophysical surveys with aerial and ground magnetic, gravimetric, seismic, and electrical methods. Experienced crews for systematic work in any part of the world.
P. O. Box 1188
Wilmington 99, Delaware

E. LEE HEIDENREICH, JR.
Consulting Engineers
Crushing Plants Quarries
Milling Plants Plant Design
Plant Layouts Appraisals
75 Second St., Newburgh, N. Y.
9 So. Clinton St., Chicago 6, Ill.

ARNOLD H. MILLER
Consulting Engineer
General Mine, Mill and Industrial Appraisals
Plant Design, Mechanization and Improvement
Cable: "ALMIL" Tel. Cortland 7-0635
120 Broadway, New York 5

POWERS AND EVANS
Consulting
Mining and Petroleum Geologists
307 Kaufman Building
Wichita — Kansas
Delmer L. Powers
David LeCount Evans
Tel. Wichita 4-7429

HARRY J. WOLF
Mining and Consulting Engineer
Examinations — Valuations — Management
420 Madison Avenue
New York 17, N. Y.
Cable: MINEWOLF
Tel.: Plaza 9-1700

HERON ENGINEERING CO.
Consulting Engineers for all types of Aerial Tramways, Cableways, and Suspension Structures
2000 South Acoma St.
Denver 19, Colorado

ARTHUR NOTMAN
Consulting Mining Engineer
55 Liberty St., 18th Floor
New York 5, N. Y., U.S.A.
Telephone BArclay 7-9484

SMITH-EMERY CO.
Assayers and Chemists
SPECTROGRAPHIC ANALYSES
781 E. Washington Blvd.
Los Angeles 21, Calif.

J. W. WOOMER & ASSOCIATES
Consulting Mining Engineers
Modern Mining Systems and Designs
Foreign and Domestic Mining Reports
National Bank Bldg., Wheeling, W.Va.
Union Trust Bldg., Pittsburgh, Pa.

HOLMES & NARVER, INC.
Engineers • Constructors
Design and Construction of Mining and Metallurgical Plants.
828 South Figueroa Street
Los Angeles 17
Trinity 8201

RODGERS PEALE
Consulting Mining Geologist
315 Montgomery Street
San Francisco 4, Calif.

SPANSKI and WILLIAMSON
Engineers — Geologists
Groundwater Exploration
Mineral Prospecting and Evaluation
Investigations and Reports
P.O. Box 151 Springfield, Illinois

WORLD MINING CONSULTANTS, INC.
Consulting Mining Engineers and Geologists
220 Broadway, New York 38, N. Y.
Worth 2-2934

Profitable Mine Operation—

calls for operating efficiency all along the line. These specialists in various phases of mine operation can aid you materially in determining quick, economical solutions to your mining problems that make for more efficient operations, resulting in lower costs and a consequent greater return on your investment. Consult them!

A NEW ONE-MAN DRILLING MACHINE

with integral air-leg feed and automatic air-water back-head

Perfected by

Thor

No. 380
AUTOMATIC DRILLING MACHINE
With Aluminum Cylinder and Piston

TOTAL WEIGHT 80 LBS.
36" OR 48"
FEED

INTEGRAL AIR FEED eliminates improvised clamping, extra air hose; consolidates drilling and feed controls on back-head of machine. Easier to set up, easier to adjust, easier to run.

AUTOMATIC AIR-WATER BACK-HEAD controls water and air from single throttle. Optional plugs for dry collaring, or dry drilling. Provides complete versatility for all drilling conditions.

Check these Thor features!

1. CONTROLS conveniently grouped on back-head for safe, convenient operation.
2. EXCLUSIVE SIX POSITION THROTTLE VALVE . . . from complete shut-off of air and water, to full air and water in logical steps for full control and convenience.
3. AIR LEG CONTROL KNOB conveniently located for natural, right-hand operation. Exclusive instantaneous push-button release for safety.
4. SINGLE AIR HOSE supplies air to drill and to leg (through drill and mounting swivel).
5. PERFECT BALANCE of drill and leg eliminates superfluous adjustments.
6. HINGE JOINT between drill and leg has tension adjustment. Exclusive extra-large friction disc holds selected tension indefinitely.
7. CONSTANT BLOWING ACTION cleans holes of cuttings, keeps cuttings out of chuck and drill.
8. FOR USE AS SINKER, air leg can be easily detached by loosening one nut.
9. WATER AND AIR HOSE swing freely at left, out of operator's way. Exclusive fastening method eliminates possibility of connections loosening or leaking.
10. EXCLUSIVE 2¼" DIAMETER FEED LEG provides added pressure to keep bit on face for longer life, especially when tungsten carbide bits are used.
11. EXCLUSIVE NEW HOLDING HANDLE provides greater safety. Conventional spade handle optional.
12. EXCLUSIVE SCRAPER RING on piston rod prevents solids from entering cylinder. "O" ring seal repels liquids.

For Complete Details or Demonstration Write

Thor PORTABLE POWER TOOLS

THOR POWER TOOL COMPANY
Aurora, Illinois

Export Division, 330 W. 42nd St., New York 36, N. Y., U. S. A.
Central America: Herramientas Thor de Mexico, S. A. de C. V., Basilio Badillo No. 47 Mexico, D. F. Mexico
South America: Thor Tool Hemisphere, Inc., Visconde do Parnahiba 1199, Caixa Postal 2899, Sao Paulo, Brazil
Western Europe: Thor Tool Continental, Inc., Nationhuis Jordaenskaai 25, Antwerp, Belgium

MORE FOOTAGE FOR YOUR DOLLAR

with Ascolite • Nicolite • Bronzolite Diamond Drill Bits

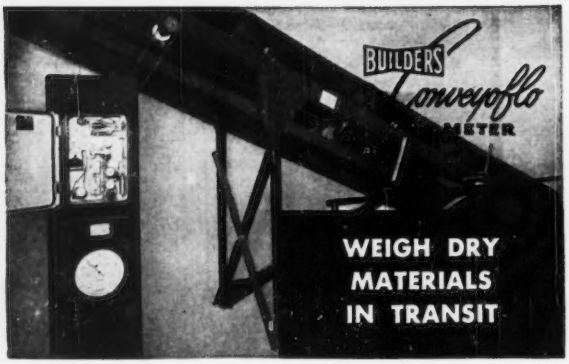
ANTON Smit & Co., Inc.

Importers & Dealers—Carbons, Bortz, Ballas
Manufacturers of Diamond Tools

333 West 52nd St., New York 19, N. Y.

Cables: PROFITABLE, New York

Send for Catalogs



This precision meter totalizes the weight of dry material passing over conveyor belts continuously, automatically, accurately. Available as a separate, self-contained unit — or for installation in your present conveyor lines.

EXCLUSIVE FEATURES:

- **Accurate . . . within ± ½ of 1% of actual weight from maximum to 50% of rated capacity; within 1% from 50% to 25% rate; within 2% from 25% to 10% of meter's rated capacity.**
- **Automatic totalizer compensation for variations in belt speed and changes in belt weight.**
- **Responds accurately to rapid load variations.**
- **Paces auxiliary equipment (feeders, controllers, continuous blending processes, etc.) and operates secondary instruments.**

•

Write for Bulletin 550-H4, giving complete details. Builders-Providence, Inc. (Division of B-I-F Industries), 391 Harris Ave., Providence 1, R. I.

BIF INDUSTRIES **BUILDERS-PROVIDENCE** BUILDERS

ALLUVIAL DEPOSITS

Gold Tin Columbite Titanium Bauxite

Most accurately and economically tested for . . . with the

EMPIRE DRILL

NEW YORK ENGINEERING COMPANY

75 West St., N. Y. City, U.S.A. Cable Address NYECO, N.Y.

Contract Core Drilling

Exploration for coal and other mineral deposits. Foundation test boring and grout hole drilling for bridges, dams and all heavy structures.

Core Drill Contractors for more than 60 years

JOY MANUFACTURING CO.

Contract Core Drill Division

MICHIGAN CITY, INDIANA

CLASSIFIED ADVERTISING

for bringing business needs or opportunities to the attention of men associated in administrative, executive, management, sales and responsible technical, engineering and operating capacities with the industries served by

The SEARCHLIGHT SECTIONS of

American Machinist
Aviation Week
Bus Transportation
Business Week
Chemical Engineering
Chemical Week
Coal Age
Construction Methods & Equipment
Electrical Construction & Maintenance
Electrical Merchandising
Electrical World
Electronics
Engineering News-Record
Engineering & Mining Journal
E & M J Markets
Factory Management and Maintenance
Fleet Owner
Food Engineering
Nucleonics
Power
Product Engineering
Textile World
Welding Engineer

For advertising rates or other information address:
Classified Advertising Division

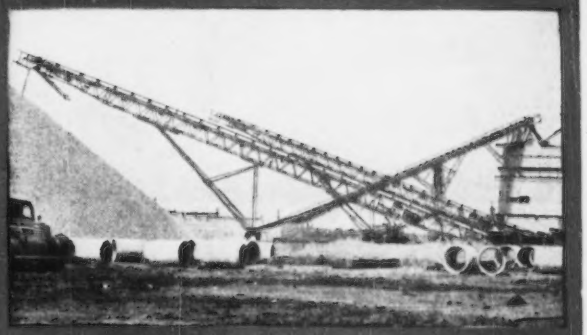
McGRAW-HILL PUBLISHING CO., Inc.
330 W. 42nd St., New York 36, N. Y.

WHAT TYPE "STACKER" DO YOU NEED IN YOUR BUSINESS?

BARBER-GREENE SUPPLIES THEM ALL

RADIAL STACKERS

Radial stackers have a pivoted receiving end about which the conveyor revolves to load dump to truck, to load in a kidney-shaped pile or to classify into different bins. May be mounted on swivel wheels or on swivel trucks operating on curved rails. Rotation is by hand or power. Furnished in all belt widths to lengths as great as 120 feet on curved rail tracks.



TRAVELING STACKERS

As the name suggests, traveling stackers may be moved from one position to another to make stock piles in various sizes and locations. May be mounted on wheels, crawlers or trucks. One popular type is mounted on four wheel trucks to move horizontally to build stock piles in long, straight lines. Traveling Stackers are furnished in all belt widths to lengths of 120 feet.

FIXED STACKERS

The most widely used stacker system. Fixed stackers are designed for applications where the material is to be elevated and discharged from a cantilever position at the head end onto a surge pile or a disposal pile. Here, as with radial and traveling stackers, the absence of support structures in the surge or stock piles does not interfere with the operation of reclaiming machines. All belt widths and lengths.

Barber-Greene

Aurora, Illinois, U. S. A.

Your grinding costs less with Norton wheels

For every grinding job you do, there's a Norton wheel to do it better . . . in less time . . . at lower cost. There's the right combination of abrasive, bond, grain size and structure for each application, above or below the surface. Check here:

SAVE! With Norton ALUNDUM* WHEELS for a wide range of mining needs. For sharpening high-speed steel tools and for grinding other hard, high-tensile-strength materials, they have no equal. Typical specification A30-O5VBE.

SAVE! With Norton regular 37 CRYSTOLON* WHEELS to provide top economy and efficiency for rough grinding gray iron and the non-ferrous metals. Typical specification 37C24-Q5V.

SAVE! With Norton green 39 CRYSTOLON WHEELS in the new vitrified K-bond to do the best job sharpening carbide-tipped bits and cutters. Typical specification 39C60-I8VK.

In Norton *Reinforced* Hub wheels — Types BD and BFR — resinoid bonding and nylon web reinforcing assure maximum safety and versatility. On portable grinders their uses include weld grinding and other smoothing operations; also cutting-off and notching.

Your Norton Distributor is ready to help you

Besides his own practical experience with abrasives in the mining field, he can call in the Norton Abrasive Engineer for additional expert aid in your grinding problems. Take advantage of the wide store of knowledge he makes available to you. See him for the right wheels for any grinding job. NORTON COMPANY, Worcester 6, Mass. Distributors in all principal cities. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Mass.

*Trade-Marks Reg. U. S. Pat. Off. and Foreign Countries

W-1487

NORTON
ABRASIVES
Making better products to make other products better

HOW ABOUT IT?

16% POWER REDUCTION
60% REAGENT REDUCTION
50% TAILING REDUCTION

——— 30% ———

INCREASED CONCENTRATE GRADE

THAT'S WHAT BOOTH FLOTATION IS DOING AT ONE PLANT.

— INVESTIGATE —

YOU CANNOT LOSE IF YOU USE BOOTH FLOTATION MACHINES

WRITE FOR INFORMATION

BOOTH ENGINEERS
146 SO. WEST TEMPLE • SALT LAKE CITY, UTAH

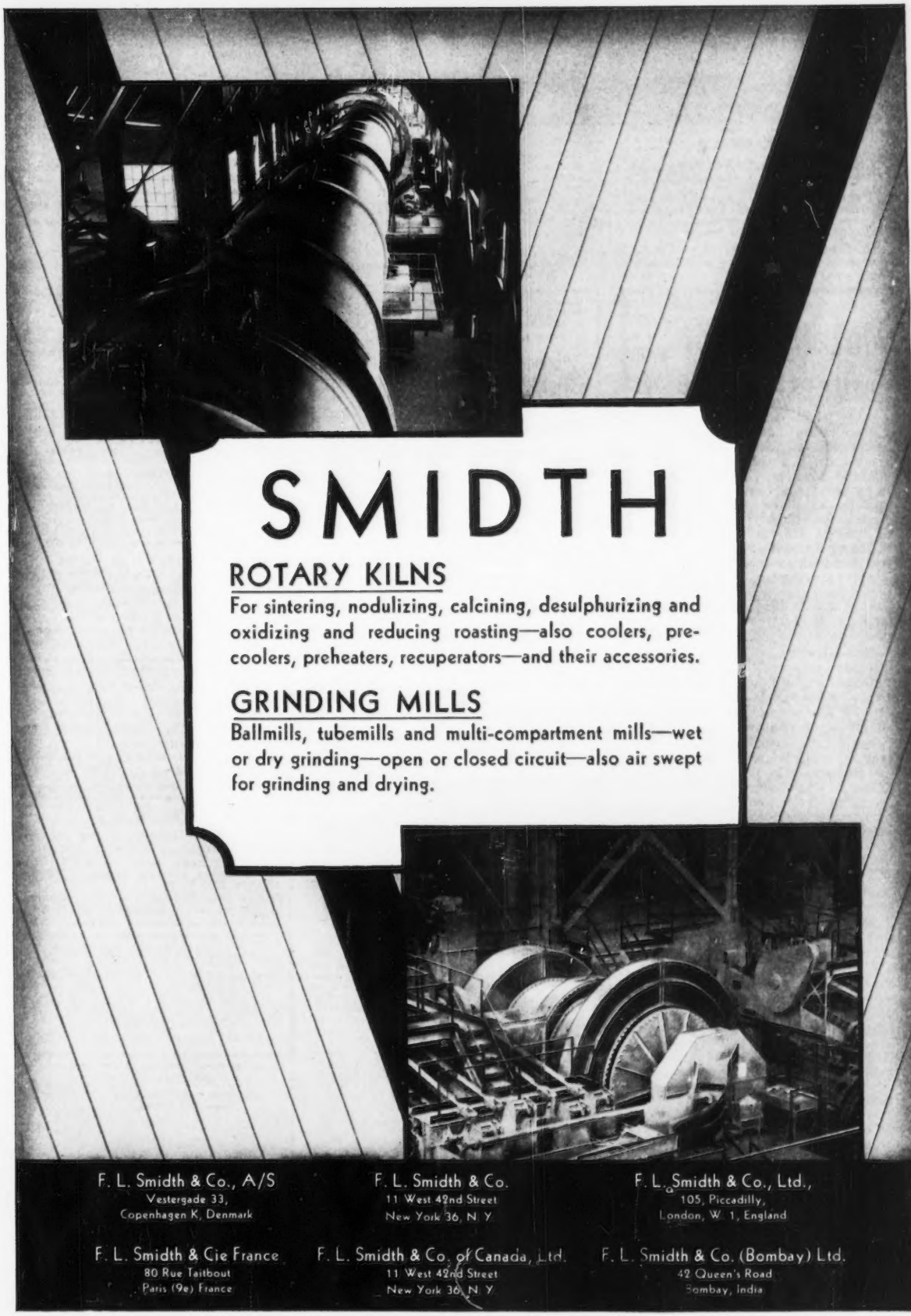
MINERALS SEPARATION • SERVICE • EQUIPMENT

DURIA CEMENTED CARBIDE

for all mining purposes as well as metal cutting and non-cutting shaping of latest production with the best effect

DURIA

DURIA-WERK
KARL KEMPF K.G.
WERK NEUSS a. RHEIN
Bockholtstraße 151 · Ruf 2902 2698


SMIDTH
ROTARY KILNS
For sintering, nodulizing, calcining, desulphurizing and oxidizing and reducing roasting—also coolers, pre-coolers, preheaters, recuperators—and their accessories.
GRINDING MILLS
Ballmills, tubemills and multi-compartment mills—wet or dry grinding—open or closed circuit—also air swept for grinding and drying.
F. L. Smidth & Co., A/S
Vestergade 33,
Copenhagen K, Denmark
F. L. Smidth & Co.
11 West 42nd Street
New York 36, N. Y.
F. L. Smidth & Co., Ltd.,
105, Piccadilly,
London, W. 1, England
F. L. Smidth & Cie France
80 Rue Taitbout
Paris (9e) France
F. L. Smidth & Co. of Canada, Ltd.
11 West 42nd Street
New York 36, N. Y.
F. L. Smidth & Co. (Bombay) Ltd.
42 Queen's Road
Bombay, India

CLASSIFIED SEARCHLIGHT SECTION ADVERTISING

EMPLOYMENT • BUSINESS • OPPORTUNITIES • EQUIPMENT—USED or RESALE

UNDISPLAYED RATE

$1.20 a line. Minimum 3 lines. To figure advance payment count 5 average words as a line. (See ¶ on Box Numbers.)
POSITION WANTED and Individual Selling Opportunity wanted undisplayed rate is one half of above rate, payable in advance.
PROPOSALS, $1.20 cents a line an insertion.

INFORMATION:

BOX NUMBERS count one additional line in undisplayed ads.
DISCOUNT OF 10% if full payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).
EQUIPMENT WANTED OR FOR SALE Advertisements acceptable only in Displayed Style.

DISPLAYED RATE

The advertising rate is $12.00 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.
AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches—to a page.

Send NEW ADVERTISEMENTS to N. Y. Office, 330 W. 42nd St., N. Y. 36, N. Y. For January Issue closing December 21st.

Metallurgical Consultant

Applications are invited from graduate Metallurgical Engineers, preferably in the age range 40 to 45, who have had not less than ten years broad and responsible experience in the field of nonferrous extraction metallurgy, for the position of Assistant Consulting Metallurgist to the undermentioned Corporation for duties in connection with the important group of Northern Rhodesian mining companies producing copper, cobalt, lead, zinc and other base metals, to which the Corporation acts as Consulting Engineers.

The salary to be offered will be commensurate with the successful candidate's qualifications and experience. Membership of the Corporation's Pension Fund will be a condition of employment.

Applicants must be prepared to take up residence in Kitwe, Northern Rhodesia. The cost of transportation of the successful candidate, his wife and children up to 18 years of age and reasonable personal effects will be borne by the Corporation. A modern three-bedroomed brick house, with essential furniture, will be made available at a rental which will not exceed $28.00 per month.

Excellent medical facilities are provided and recreational amenities are outstanding.

Initially the engagement will be for a period of three years, after which service may be extended indefinitely, but will be subject to six months notice of termination by either party. Repatriation privileges on the same scale as above will be granted at the end of three years service. Leave is generous and amounts at present to 60 days per annum which can be accumulated up to a maximum of 180 days.

Applications stating age, marital status, educational and professional qualifications and giving details of past experience and positions held should be addressed to:

Personnel Officer,
Anglo American Corporation of South Africa, Limited,
P.O. Box 4587, JOHANNESBURG.

METALLURGICAL ENGINEER

SOUTHERN CALIFORNIA

Permanent position in established Zinc Smelter. Degree and operating experience in Zinc Smelting required. Salary open. Location Los Angeles. Apply by letter indicating age, educational and technical background. Enclose recent snapshot, if available.

P9788 Engineering & Mining Journal
1111 Wilshire Blvd., Los Angeles 17, Calif.

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (36)
CHICAGO: 520 N. Michigan Ave. (11)
SAN FRANCISCO: 68 Post St. (4)

POSITIONS VACANT

EXPERIENCED ORE TRADER. Old established house interested to employ experienced Ore trader dealing principally import-export and world trading all minerals. Reply giving full details, experience, background, & photograph if available, P-9136, Engineering & Mining Journal.

WANTED—ASSISTANT Smelter Superintendent in South Africa, technical graduate with several years experience in responsible employment in copper and smelter. P-8460, Engineering & Mining Journal.

POSITIONS WANTED

MGR.; GENL. Supt.; Dir. Research; mine exam. 58. S.B. Min. Eng. & Geol.; S.M. Process Met.; Sc.D. Process & Physical Metallurgy. Labor experience North and South America. Bilingual Spanish. Ample experience Geol., Min., Mill., Smelt., Eng., Adm., Railroads, Min. Exam., Constr., modern equipment. Excellent health. Married, no small children. Available immediately. Correspondence invited. PW-9924, Engineering & Mining Journal.

MINING & METALLURGICAL Engineer graduate with sales ability wishes to sell products requiring a technical background. Age 30, married, two and a half years experience with nonmetallic mining operation from plant engineering to management. Current position highly technical involving management contacts of all types of industry. PW-9904, Engineering & Mining Journal.

MECHANICAL ENGINEER desires foreign employment in Europe or Latin America. Age 35, married, one child. Previous Latin American experience. Spanish speaking. Fifteen years heavy experience in power, mining, construction. Presently employed by large construction firm. Available on short notice. Excellent references. Inquiries invited. PW-9791, Engineering & Mining Journal.

ORE MERCHANTS:—Geologist, 27, married. M.S., 2 years varied geologic experience. Seeks position with future in East with established Ore Merchants. Employed. Available reasonable notice. PW-9831, Engineering & Mining Journal.

BUSINESS OPPORTUNITY

Best offer for 12 patented mining claims and 6 patented fractions, all lying between two known copper orebodies in the Yerington copper district. One & ¾ miles from $40,000,000 leaching plant. Box 245, Yerington, Nevada.

Manufacturers Representative

Graduate engineer with successful selling record in New York interested in adding line chemical or metallurgical equipment and representing manufacturer as agent and consultant.

RA9783 Engineering & Mining Journal
330 W. 42 St., New York 36, N. Y.

WANTED INDUSTRIAL PLANTS

Will arrange thru purchase of (1) capital stock, (2) Assets, (3) Machinery and equipment, whole or in part—Personnel usually retained, strict confidence. Box 1351 Church Street Station, New York 8, N. Y.

We Specialize in Buying Complete Mining, Milling or Construction Plants

We have purchased 14 within three years. Please contact us before you sell.

BO 5701 Engineering & Mining Journal
520 N. Michigan Ave., Chicago 11, Ill.

We Cordially Invite Your Inquiry
regarding our present availability to sell your metal and mineral productions

COSMOPOLITAN SALES COMPANY
Selling Agents
Suite 1003, 450 Seventh Ave., New York 1, N.Y.
CHickering 4-1739-40

FOR SALE

1—INGERSOLL RAND HIGH PRESSURE AIR COMPRESSOR.
Type 40, 4 stage, Model GC-50-BW, driven by Waukesha Gasoline Engine, 3,000 lbs. pressure 70.6 CFH

FS8853 ENGINEERING & MINING JOURNAL
330 W. 42 ST., NEW YORK 36, N. Y.

MAGNETIC DRUM

Stearns: 48" diam. x 26" face; with 5 kw 125-v d.c. 7½ hp 440-v. a.c. m.g. set, and 3 hp 440-v Coppus blower—Price $1150.00

Paul F. Smith
39 W. Adams St. — Phoenix, Ariz.

200 miles per hour at your convenience in your own office

You can easily go 500-600 miles in only two or three hours in roomy comfort, any time during the business day, direct to any airport, without concern for public transit schedules, routes, connections, reservations, or cancellation—and be home by dinner.
Make your travels refreshing, pleasurable assets, instead of tiring, time wasting liabilities. Write today to

REMMERT-WERNER, Inc.
Lambert Field • St. Louis 21, Mo.
EXECUTIVE AIRCRAFT

SINCE 1898 DEPENDABLE RECONDITIONED MACHINERY

HOISTS—ELECTRIC

1—10 HP Vulcan #0 Single Drum
1—15 HP Morse New Single Drum
1—20 HP H&B Single Drum
1—22 HP Vulcan Single Drum #1½
1—30 HP Vulcan, Double Drum
1—30 HP Vulcan Single Drum
1—37 HP Single Drum
2—52 HP Vulcan #4½ Single Drum
1—50 HP Fairbanks-Morse Single Drum
1—60 HP H&B Single Drum
1—60 HP Vulcan #23ELF Single Drum
4—100 HP Box Single Drum
1—112 HP Vulcan Single Drum
2—150 HP Vulcan Single Drum
1—350 HP Dillon-Box Single Drum
1—600 HP Box Single Drum
1—22 HP Vulcan #1½ Double Drum
1—60 HP Ottumwa Double Drum
1—40 HP American 3 Drum
1—80 HP Thomas 3 Drum
1—80 HP Lidgerwood
1—80 HP Clyde 3 Drum

FILTERS

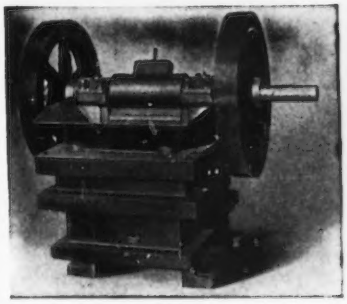
1—6' 2-disc American Filter
1—6' 3-disc American Filter
1—18" Morse Round Pattern Filter Press
1—36" Merrill Triangular Filter Press
1—#12 Sweetland Filter Press, 38 leaves

FLOTATION MACHINES

1—New Morse Jetair 2 cell #7
1—29 x 7 Fagergren Single Cell
1—6 cell 18" Stearns-Roger
2—6 cell Denver "Sub A" #21
1—New Morse Jetair 6 Cell #30

PORTABLE COMPRESSORS

1—105 CFM Ingersoll Rand Portable Driven by 4 Cylinder Gasoline Engine
1—210 Worthington "Blue-Brute" Portable Driven by Continental 6 Cylinder Gasoline Engine
1—240 CFM Schramm Portable Driven by Buda 4 Cylinder Gasoline Engine
2—310 CFM Gardner Denver Driven by Buda 4 Cylinder Gasoline Engine
1—310 CFM Sullivan driven by Buda 4 Cylinder Gasoline Engine



CRUSHERS

4—2¼" x 3½" New Morse Lab Jaw Crushers
5—4" x 6" New Morse Lab Jaw Crushers
1—9" x 14" Universal Jaw Crushers
1—9" x 15" Wheeling Jaw Crusher
1—9" x 15" Farrell Jaw Crusher
1—9" x 16" Universal Jaw Crusher
1—8" x 24" Rogers Jaw Crusher
1—8" x 36" Universal Jaw Crusher
1—11" x 18" Universal Jaw Crusher
1—24" x 13" Farrell Jaw Crusher
1—10" x 16" Hercules Jaw Crusher
1—36" x 48" Jeffrey Flextooth Crusher
1—26" x 18" Williams Hammermill
1—30" x 17" Williams Hammermill

DRYERS

1—3' x 16' Bartlett & Snow Rotary Dryer
1—7'6" x 125' Mosser Rotary Kiln

LOCOMOTIVES

1—2-2½ ton Whitcomb Battery, 24" gauge
1—2½ ton Jeffrey battery or trolley, 36" gauge
1—3½ ton Mancha battery, 25" gauge, with 2 sets Edison batteries and charging set
1—3½ ton Mancha battery, 24" gauge
1—4 ton Westinghouse battery, 24" gauge
1—4 ton Ironton battery, 36" gauge
2—7 ton General Electric permissible battery, 36" gauge
1—7 ton Atlas battery, 36" gauge
3—8 ton Ironton battery, 36" gauge
2—8 ton General Electric battery, 36" gauge
4—10 ton Atlas battery, 36" gauge
1—10 ton Atlas battery, 36" gauge
1—4½ ton Goodman trolley, 36" gauge
1—5 ton Jeffrey trolley, 36" gauge
3—8 ton Ironton battery, 36" gauge
2—8 ton Goodman trolley, 36" gauge

BALL & ROD MILLS

1—4' x 4' Colo. Iron Works Ball Mill
2—6' x 48" Hardinge Conical Ball Mills with air swept equipment.
1—8' x 22" Hardinge Conical Pebble Mill
1—3' x 8' Marcy Rod Mill

DIAPHRAGM PUMPS

3—2" New Morse Diaphragm Pumps
2—4" New Morse Diaphragm Pumps
1—2" Dorrco Duplex Pump
1—4" Barnes Pump
1—4" Dorrco Duplex Pump
2—4" Butchart Pumps
1—4" Dorrco Pressure Diaphragm Pump

RAIL

We have in stock good relaying rail, 16# to 90# also new 16# to 20# with fittings.

Send for Catalog 521E

MORSE BROS. MACHINERY COMPANY

2900 Brighton Blvd. P.O. Box 1708 Keystone 5261 DENVER, COLORADO

FOR SALE

2—Sutton, Type ORE, Model B-100 Air-float Separators.
1—4¼ x 5, Six Cyl. Wisc. Gas Power Unit, Appx. 65 H.P.
1—14" x 50' long belt conveyor, mt'd. on steel channels—Motorized.
1—3" Wilfley Sand Pump
1—12" x 5" Denver Batch Ball Mill
1—Massco Auto. Density Controller
1—6½' x 5' Conditioner—Steel Tank
2—Agitator Mechanisms for 8' x 10 Tanks.
1—6 x 12 Wheeling Jaw Crusher
1—3" Dorrco Duplex Diap. Pump—Motorized
2—Adams Wet Reagent Feeders
1—Size G-8 I.R. Pedestal Air Grinder
1—18" Dings Magnetic Pulley, complete with Mech., belt and charger
Motor Mt'd. Cent. Pumps—Deep Well Pumps
Motors—¼ H.P. to 50 H.P.

Write for Stock List No. 12

Florence Machinery & Supply Co.
904 Equitable Bldg., Denver 2, Colo.

1—800, 1100 & 1500 Barrel Cement Plants—Complete lime hydrating plant
Rotary Dryers—4' x 30', 6' x 40', 5' x 50', Tube & Ball Mills—6' x 9'—5' x 22'—5½' x 20', 5' x 100'—7' x 120' & 8' x 150' Modern Kilns.
Jaw Crushers—From 10" x 6" up to 48" x 60".
Crushing Rolls—From 12" x 24" up to 54" x 24".
Sturtevant Rotary fine crushers—No. 0—No. 2—7 x 7—6 x 12 & 8 x 6 Ball Mills.
Ring Roll Mills—Sturtevant No. 1—No. 2 duplex Mills.
5'—16' & 18' Hereschoff furnaces.
Gyratory crushers, No. 3 to No. 12.
#322 & #622 Allis-Chalmers Hydrocone Crushers
Magnetic separators—Jigs—screens—classifiers, thickeners, air separators & filters.
4'—5'—6' & 7' dia. Rod Mills.
New Dryers—Kilns & Dust Collectors.
6"—10"—14"—16" McCully Superior gyratory crushers.

W. P. HEINEKEN, INC.
50 Broad Street, New York

PIPE

SURPLUS NEW and USED FOR SALE

SAVINGS FLOW

FROM *SPEED-LAY* PIPE SYSTEM

EVERYTHING FOR A COMPLETE PORTABLE PIPE SYSTEM

FACTORY PACKAGED
PIPE COUPLINGS—FITTINGS
VALVES—ACCESSORIES
LIGHTWEIGHT, LABOR SAVING
immediate installation
by one unskilled man. 2½ to 30 o. d. black or galvanized. Ready to lay—without delay.
Complete inventory of all Industrial Pipe, Valves, Fittings, and Flanges.

FOR SALE OR RENT

DELIVERED READY FOR INSTALLATION

SPECIALISTS IN PREFABRICATED PIPING

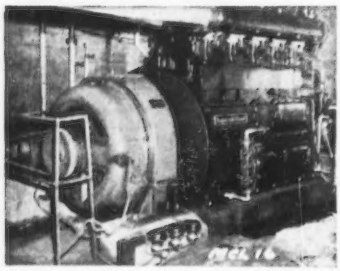
ALBERT
PIPE SUPPLY CO., INC.
Berry at North 13th St.
Brooklyn 11, N. Y.
Phone EVergreen 7-8100

SEND COUPON NOW!
ALBERT PIPE SUPPLY CO., INC.
Berry at N. 13th St., Brooklyn 11, N. Y.
Please send free booklet describing your Speed-Lay System and services

NAME
FIRM NAME
ADDRESS
CITY STATE

185 KW DIESEL GENERATING UNIT

480 V. 3 ph, 60 cycle



Intermediate Speed—Like New

Engine: Ingersoll-Rand Type S, 273 BHP 720 rpm, air starting, 5 cyl, 1946 model.

Accessories: Woodward Governor, oil & fuel filters, water pumps, fuel & water tanks heat exchangers, starting equip.

Generator: Elliott 231 KVA, 185 KW, 480 v. 3 ph, 60 cycle, .8 pf, with 5 KW exitor.

Also includes panel board, piping, extra parts and tools.

Write for complete specifications and price.

MACHINERY CENTER, INC.

Formerly: Roger Pierce Equipment Sales Co.

808 Newhouse Building

Salt Lake City, Utah

1—78-foot steel headframe—weight approx. 86 tons, $2,000.00 or $25.00 per ton in place.

1—Rectangular steel ore bin. Dimensions top of bin 27'x56'. Divided into 3 compartments. Total live capacity 930 tons. Weight about 77 tons. $40.00 per ton in place.

2—10-ton Goodman locomotives, trolley type, $4,000.00 each.

1—Model 20 Eimco Loader, 36" gauge, $1,500.00.

1—Model 21 Eimco Loader, 36" gauge, $1,700.00.

1—Allis-Chalmers centrifugal pump with motor and compensators, $6,500.00.

2—G.E. 600 h.p. motors, 2200 V, 3 ph, 60 cy, 1770 RPM, Type KTP, $3,000.00 each.

1—Westinghouse oil circuit breaker. G-10, 400 amp, 60 cy, 3 ph, S.O. 62E77. W / electrical operating mechanism, $1500.00.

1—G.E. metering transformer, type RFE, 3 wire, 3 ph, 60 cy, Pri. volts 40250, Sec. Volts 115, Pri. amps 50/100. Sec. amps 5. Transformer ratio potential 350 to 1. Current 10/20 to 1. $1,000.00.

1—#523 Masco bit grinder. Style TUM 38, bench type, 5 h.p. motor, 220-440 V. Bit grinding circulating water pump, Style 3900, size 3/4. $500.00.

For further information on above material, write

Consolidated Coppermines Corp.

Kimberly, Nevada

or phone 2Y-4. Ely, Nevada

COMPRESSORS

DISTINCTLY DIFFERENT IN QUALITY — IN PRICE

GAS • DIESEL • ELECTRIC-STEAM

A Rental Compressor For Every Job

55 CFM Lindsay (GAS) Portable
60 CFM Worthington (GAS) Portable
70 CFM Smith (GAS) Portable
89 CFM 6 x 7 Worthington HP, 15 HP Elec.
105 CFM Worth-IR-CPT Portable
107 CFM 7-7 x 7 Ingersoll ES-1 STEAM
129 CFM 7½ x 7 American AF1, 20 HP
160 CFM IR-Worth—Portable
165 CFM Smith 110SR Semi-Portable, 25 HP
194 CFM Worthington Semi-Portable, 40 HP
195 CFM 8-9 x 9 Worthington HS STEAM
210 CFM Worthington (GAS or DIESEL) Port
211 CFM 9 x 9 Worthington HB, 40 HP Elec.
279 CFM 11-10 x 11 Worthington HS STEAM
294 CFM 10 x 12 Worthington HB, 50 HP
315 CFM Worthington (GAS or DIESEL) Port
388 CFM Worthington Semi-Portable, 75 HP
445 CF M Gardner Semi-Portable 75-100 HP
462 CFM 12-14½ x 13 American AF-S STEAM
500 CFM Worthington (DIESEL) Portable
538 CFM Worthington Semi-Portable, 100 HP
600 CFM Worthington (DIESEL) Portable
628 CFM 14 x 13 Ingersoll ES-1, 100 HP

SELL—BUY—TRADE
RENT—REPAIR
COMPRESSORS SINCE 1902

American
AIR COMPRESSOR CORP
47th ST & DELL AVE NORTH BERGEN, N. J
Telephone UNion 5-4848

GOV'T. SURPLUS PUMPS

Brand new Cenco Megavac Vacuum Pumps, model 92010A, complete with connecting cord, hose assembly and attachment plug. Specially priced at $137.50 each, f.o.b. New York.

Medical Salvage Co., Inc.
217 E. 23rd Street
New York 10, N. Y.

EXCEPTIONAL BUYS IN SLIGHTLY USED EQUIPMENT

P&H 1055LC hilift shovel—late model—used only slightly—very cheap
Lima 604 hilift coal loading shovel w/2½ yd. bucket, used three months
Lima 1201 hilift shovel—late model—used slightly
Telsmith 25" x 36" portable crushing plant

AL J. GOODMAN

DAY PHONE 3-6456 | P. O. BOX 263 ASHEVILLE, N. C. | NITE PHONE 5668

RELAYING RAIL

All Sizes
Track Accessories
LEFTON INDUSTRIAL CORP.
***Genl. Office:* 212 Victor St.**
St. Louis 4, Mo.

Walking draglines, Monighan 450W, 200W, 9W, 6W, 5W, 3T; Marion 7200; Page 625-E.
Shovels, cranes, dragls., 1½ to 18 yds. (15).
Locomotives, diesel, gas, 7 to 80 tons (10).
Gold dredges, 6'. (2). Also, 4' placer dredge.
Euclid, Mack diesel trucks, 15, 22, 32 tons.
Diesel-elec. generator sets, 1000 KW, 520 KW.
B-Erie 42-T blast hole drill, elec., 9".
Rotary kilns, dryers, 8'x125', 7'x125', 6'x60'.

H. Y. SMITH CO., 828 N. B'way, Milw. 2, Wis.

CONCENTRATOR EQUIPMENT

1 belt driven Marcy Ball Mill. Internal scoop feeder and 40 h.p. motor, 220-vol.

1 jaw crusher (belt driven) with 25 h.p., 1,200 rpm., 60-c., 3-ph., 220-V, G.E. motor.

Bohn Aluminum & Brass Corporation
DETROIT 26, MICH.

FOR SALE BY OWNERS

4—9 cu yd Mack dump trucks, air brakes, gasoline driven, 6 wheels
2—15 cu yd Mack dump trucks, Model LPSW, Thermodyne with Bogie drive, air brakes, gas driven, 10 wheels, new in 1946
1—20" belt conveyor 180' centers, complete with pulleys
1—8' x 24' Dorr classifier, Model DSF
1—4' x 30' x 15' Dorr bowl classifier, serial #US-3452
1—4' x 23' x 6' Dorr bowl classifier
1—42" x 60" Marcy pebble mill serial #630
5—Wemco thickener mechanisms with Westinghouse type CS induction motors
2—14' x 18' Oliver filters serial Nos. 5887L & 5888R
1—Chicago pneumatic vacuum pump OIDB serial #28251RH
1—Scotch dry back 50 HP boiler
1—6" Wilfley pump serial #C66505 with Westinghouse 50 HP motor

FS 9759 Engineering & Mining Journal
68 Post St., San Francisco 4, Calif.

ELECTRICAL WIRE AND CABLE

YOUR BEST SOURCE . . .

- for every industrial and power application
- odd lengths—long and short—reasonably priced
- largest stock in Midwest
- varnished cambric—leaded—neoprene

Let us quote on requirements—send your inquiries

DELIVERY

QUICK . . . from stock

We'll also buy your Surplus

Branch Offices:
Houston—Yukon 5547
Los Angeles—DUnkirk 7-3265

UNIVERSAL Wire and Cable Co.
2664 N. Clybourn Ave., Chicago 14, Ill.
EAstgate 7-4777 Code: UNIWIRE

One Worthington Elevator Pump

Serial #877407, 4" suction, 3" discharge, 525 lb. head, 250 GPM, 158 HP, 3670 RPM, 10" impellor, test pressure 1000 lbs., with Westinghouse reduction gear, serial #1994, pinion RPM 3670, gear RPM 1260, normal rating 158 HP, unused.

Marine Electric Co.
2121 N. W. Thurman St., Portland, Oregon
BRoadway 6447

DIESEL ENGINES • GENERATOR SETS

10 TO 2000 KW • AC & DC • GUARANTEED

"We Own What We Offer"

A.G. SCHOONMAKER CO., INC.
50 CHURCH ST. NEW YORK 7, N. Y.

Plants: SAUSALITO (S. F.) CAL., JERSEY CITY, N. J.

EQUIPMENT

Latest type Metallurgical and Chemical Equipment

EXCELLENT CONDITION

Hardinge Conical Ball Mill 10′ x 48″
Dorr Causticizing Equipment
Oliver Rotary Vacuum Filters All Iron
Dorr Type A Thickeners
Sampling Mill
Link Belt Screw & Belt Conveyors
Turbo Mixer Agitators
Norblo & Sly Dust Collectors
Hardinge Feedometers
Oliver, Dorr, Morris, Worthington process pumps
Tanks and Bins
Instruments and Controls

The above items include all auxiliary equipment with individual motor and control 220/440/3/60. The equipment may be inspected on foundations.

Complete List with Specifications Available.

The VULCAN DETINNING CO.
SEWAREN, N. J.

FLUID DRIVE · GYROL TYPE VS

HYDRAULIC COUPLINGS

Stepless speed variation with constant speed prime mover made by American Blower Co.
Ideal for pumping stations, steel mill drives, mechanical draft fans, crushers, rotary kilns, etc.
Wide range of capacities—Condition 98% new
200 HP to 2500 HP Input
300 RPM to 900 RPM Input
Complete data & quotation on request.
Also large selection of marine couplings, reduction gears, & Falk grid type couplings in stock.

A.G. **SCHOONMAKER CO., INC.**
50 Church St., New York 7, N. Y.

FOR SALE—DREDGE

Location—
Lake Linden, Michigan

Steel hull 56 feet wide, 110 feet long, overhanging deck 8 feet wide each side. Weight of hull stripped, 400 tons. Suction ladder 137 feet long will dig 115 feet below water line. Main pump 20 inch inlet and discharge, 1250 KW, 25 cy. motor. Pump lined, shell in 2 halves vertically with front and back unlined heads. Runner is 55 inch diameter on 8 inch diameter pump shaft. 2—4 drum winches, one of the drums for ladder hoist the other 7 control lines for movement of dredge which is not self-propelling. Dredge has high pressure motor driven water pumps and boiler for heating and low pressure steam. Electricity supplied at 2300 volts, lines coming into dredge on towers attached to pontoons carrying the discharge pipe. Rated capacity 10,000 cubic yards per day.

For prints and further information write to

CALUMET DIVISION
CALUMET & HECLA, INC.
Purchasing Dept.
Calumet, Michigan
Telephone 2000 — Ext. 63

NEW BELT CONVEYOR: Mine type, 24″ belt, 1100 ft. cc complete with all mechanical parts, motor and drive. NEW, UNUSED.

CLASSIFIERS:
4—Akins 54″ x 34 ft. Simplex with lifting device, 220/440 volt motors. 2—Wemco 78″ Simplex single screw, double pitch, 28½ ft. tank, 220/440 volt motors. All in condition like NEW. 1—Wemco Duplex size 72″ x 32 ft., type SH, pitch double and variable, with lifting device, 220/440 volt motor, NEW and UNUSED. Three located Nevada.

JAW CRUSHERS:
Size 12″ x 15″ to 48″ x 60″.

PULVERIZERS:
1—Hardinge 10′ x 36″, one 10′ x 48″ and one 5′ x 22″ Conical Ball Mills, complete with motors, drives and auxiliary equipment for dry grinding. 1—NEW Ball Mill 9′6″ x 11 ft., trunnion type, for dry grinding.

CAR SHAKE OUT:
Robins for standard railroad gauge cars, 4.0 volt, 60 cycle, NEW, UNUSED.

LOCOMOTIVE, DIESEL ELECTRIC:
65 ton, 0-4-4-0. For sale or rent.

LOCOMOTIVE CRANE: Link Belt 25 ton capacity, standard R.R. gauge, gasoline powered, cast steel trucks, air brakes, with or without 1½ yd. Williams clam shell bucket, thoroughly modern, excellent condition, located Minnesota.

CLAM SHELL BUCKET: Blaw Knox size 7250, 2½ yd. capacity, NEW condition.

TUGGER HOISTS: Ingersoll Rand 3 drum, 50 H.P. and 4—Ingersoll Rand type 220, 20 H.P., 220/440 volt.

SINGLE DRUM HOISTS:
100 H.P., 1⅛″ rope, 5′ dia., 5′ face.
200 H.P., 1⅛″ rope, 5′ dia., 7′ face.
200 H.P., 1″ rope, 5′ dia., 5′ face.
225 H.P., 1⅜″ rope, 44′6″ dia., 4′ face.
300 H.P., 1¼″ rope, 5′6″ dia., 4′ face.
350 H.P., 1⅜″ rope, 7′ dia., 6′ face.
400 H.P., 1⅜″ rope, 7′ dia., 7′ face.
800 H.P., 1⅜″ rope, 7′ dia., 5′ face.
900 H.P., 1¾″ rope, 10′ dia., 6′3″ face.

DOUBLE DRUM HOISTS:
100 H.P., ¾″ rope, 3′ dia., 2′ face, clutched.
300 H.P., 1⅛″ rope, 6′ dia., 4′ face, clutched.
350 H.P., 1⅛″ rope, 6′ dia., 4′6″ face, clutched.
400 H.P., 1¼″ rope, double conical drums, wraps 1183 ft. on each drum.
500 H.P., 1⅛″ rope, 8′ dia., 5′ face, clutched.
600 H.P., 1⅝″ rope, double conical drums, wraps 1200 ft. on each drum.
900 H.P., 1⅞″ rope, 14′ dia., 7′ face, clutched.
1100 H.P., 1⅞″ rope, 10′ dia., 6′10″ face, clutched.
1200 H.P., 1¾″ rope, 9′ dia., 6′ face, clutched.
2700 H.P., 1⅞″ rope, 12′ dia., 7′ face, clutched.

All above Hoists complete with motors and controls. Drawings and photos available.

WE BUY AND SELL EQUIPMENT THROUGHOUT NORTH AND CENTRAL AMERICA

A. J. O'NEILL
Lansdowne, Pa.
Phila. Phones: MAdison 3-8300 — 3-8301

---

5 SURPLUS MERRICK E WEIGHTOMETERS
For 18″, 24″, 30″, 36″ & 42″ Belts

CRUSHERS
JAW: 48x60, 42x48, 30x36, 24x36, & 30x42
REDUCTION: 1′8″ & 3′ TRAYLOR TY
322 & 636 R ALLIS CHALMERS

GRINDING MILLS
TUBE MILLS: 5′x18′, 5′x22′, 5½′x20′ & 6′x22′
BALL MILLS: 5x4, 6x6, 6x12, 7x6 & 9½x11
HARDINGE: 5′x22″, 6′x22″, 8′x22″, 10′x36″ & 10′x48″
ROD MILLS: 4′x7′, 5′x14′ & 3′x10′

CLASSIFIERS & THICKENERS, ETC.
DINGS MAGNETIC: Type 1-R—3 STAGE—60″
DORR 40′ D.x30′—3 TRAY, 4 COMP. THICKENER
STANDARD THICKENERS: 12′ to 100′ dia.
DORR CLASSIFIERS: 3′x25′x10′ Turret Bowl
6x22 DSE, 2x15 SSFR
#1 & #2 WEMCO SINK-FLOAT MILLS.
12′x10′ DORRCO DRUM FILTER
8 DISC 8′6″ AMERICAN AND OTHER FILTERS

AIR COMPRESSORS
9 Electric 5,000, 3,865, 3,178, 2,200, 1,578 & 1,302, 1,090, 676 & 500 Ft.
6 Diesel 1,578, 1,090, 676 & 500 Ft.

LOCOMOTIVES
8 Goodman 4 ton — 8 ton Battery Locomotives.
12 Diesel 100, 80, 65, 45, 30, 20 Ton Locomotives.
22 Gas, 35, 25, 16, 12, 8 & 6 Ton Locomotives.
7 4 ton, 6 ton, 13 ton Trolley.

R. R. CARS
100 Dump Cars, 2, 4, 12, 20 and 30 yd.
100—60 Ton Flat Cars. 66—50 Ton Gondolas.
150—8,000 & 10,000 Gal. Cap. Tank Cars.

TUNNEL MUCKERS — LOADERS
4 Gardner Denver GD9 & GD14.
10 Eimco 40 & 12B & 21, 4 Sullivan ML20.

CRANES
30 Ton Ind. B.H. 70 Ft. Boom Loco. Crane.
3—802 & 1201 Lima Comb. Cranes & Draglines.

SECTIONAL FRAME CRUSHERS
2 Buchanan MODEL C 30 x 42

MISCELLANEOUS
Rotary Dryers: 4x20, 4x40′, 5½x40 & 7′x60′.
Kilns: 4′x28′, 6′x60′, 7′x60′ 8′x72′ & 8′x125′.
Mine Hoists: 75, 200, 300, 400, 600 & 1300 H.P.
40—10,000 Gal. R.R. Car Tanks.
Hercules Junior 3 Roll Pulverizer.
36x24 Jeffrey B2 Pulverizer.
7—20,000 Gal. Steel Storage Tanks.

R. C. STANHOPE, INC.
60 E. 42nd St., New York 17, N. Y.

CARLYLE INDUSTRIAL RUBBER PRODUCTS FOR EVERY PURPOSE

IMMEDIATE DELIVERY OF CONVEYOR, ELEVATOR AND TRANSMISSION BELTING — PIPE — WATER SUCTION, AIR STEAM AND WELDING HOSE

WHY WAIT
We have 8 to 48
RUBBER CONVEYOR BELTING

TOUGHCOVERS—Heavy duty, specially compounded abrasive resistant rubber covers having high tensile strength. Thoroughly capable of withstanding the abrasive action of bulk materials. Properly vulcanized to the carcass to assure utmost performance, economically.
STRONG CARCASS—Constructed of finest quality 28 and 32 ounce tough cotton duck, properly treated and impregnated to avoid mildew from moisture and atmospheric conditions. Each ply thoroughly embedded in rubber to prevent ply separation.
FLEXIBILITY — Careful attention has been given in the construction of all belts to have the proper flexibility assuring the following desirable features: troughs easily runs true on all idlers, gauge resistant, excellent for long and short hauls and slope installations.

Avoid delays in your production schedule!

We carry in stock for your immediate requirements, Conveyor Belting in widths from 8 inches to 48 inches

Width	Ply	Thickness Top Cover	Thickness Bottom Cover	Type of Duck Carcass
8″	4	1/16″	1/32″	28 Oz.
10″	4	1/16″	1/32″	28 Oz.
12″	4	1/16″	1/32″	28 Oz.
14″	4	1/16″	1/32″	28 Oz.
16″	4	1/8″	1/32″	28 Oz.
18″	4	1/8″	1/32″	28 Oz.
20″	4	1/8″	1/32″	28 Oz.
20″	5	1/8″	1/32″	28 Oz.
24″	4	1/8″	1/32″	28 Oz.
24″	5	1/8″	1/32″	28 Oz.
26″	5	1/8″	1/32″	28 Oz.
30″	4	1/8″	1/16″	32 Oz.
30″	5	1/8″	1/16″	32 Oz.
30″	6	1/8″	1/16″	32 Oz.
36″	6	1/8″	1/16″	32 Oz.
42″	5	1/8″	1/16″	32 Oz.
48″	5	1/8″	1/16″	32 Oz.
48″	8	1/8″	1/16″	32 Oz.

INQUIRE FOR SIZES NOT LISTED
ELEVATOR TRANSMISSION & V-BELTING ALSO IN STOCK.

All our belting made by the leading belting manufacturers.

Write for Free Booklet on Installation, Care & Maintenance of Conveyor Belting.
SEND US YOUR INQUIRIES FOR OTHER RUBBER PRODUCTS

CARLYLE RUBBER CO., Inc.
62-66 Park Place, New York 7, N. Y.
Phone: Digby 9-3810

MOTOR GENERATOR SETS
1—600 KW GE Syn. 275 V. DC, 900 RPM
2—300 KW GE Syn. 275 V. DC, 1200 RPM
2—300 KW WEST. Syn. 275 V. DC, 1200 RPM
2—200 KW GE Syn. 275 V. DC, 1200 RPM
2—150 KW GE Syn. 275 V. DC, 1200 RPM

LOCOMOTIVES
1—13 T JEFFREY 250 V. MH-110 32-44″ Ga.
2—10 T JEFFREY 250 V. MH-110 32-48″ Ga.
1— 8 T WEST. 250 V. ML-925-LK 24-28½″
2— 8 T WEST. 250 V. ML-905-C 24-36″ Ga.
2— 8 T JEFFREY 250 V. MH-100 32-36″ Ga.
1— 5 T WEST. 250 V. ML-903-C 24-36″ Ga.
2— 4 T GE 250 V. HM-825-A 30-36″ Ga.
2— 4 T WEST. 250 V. ML-901-C 18-44″ Ga.

WALLACE E. KIRK COMPANY
505 Grant Building, Pittsburgh 19, Penna.

ALPHABETICAL INDEX TO ADVERTISERS

(This index is published as a convenience to the reader. Every care is taken to make it accurate, but E&MJ assumes no responsibility for errors or omissions.) Where an asterisk * precedes manufacturer's name, more detailed information may be found in the *1952-53 edition of the Mining Catalog*:

Aero Service Corp. ... 56
Allen-Sherman-Hoff Pump Co. ... Second Cover
*Allis-Chalmers Mfg. Co. (General Machinery) ... Third Cover, 14, 37, 52
Allison Div. General Motors ... 32
*American Air Filter Co., Inc. ... 160
*American Chain & Cable (Hazard Wire Rope Div.) ... 29
American Forge Co. ... 175
*American Manganese Steel Div. (American Brake Shoe Co.) ... 57
*American Mine Door Co. ... 190
American Rubber Mfg. Co. ... 142
*American Steel & Wire Div. U. S. Steel Corp. ... 35
Anaconda Wire & Cable Co. ... 55
*Atlas Car & Mfg. Co. ... 164
Atlas Powder Co. ... 25
Atlas Steels Ltd. ... 163

Baker & Adamson General Chem. Div. Allied Chem. & Dye Corp. ... 152
*Baldwin-Lima-Hamilton Corp. (Car Div.) ... 18
*Baldwin-Lima-Hamilton Corp. (Locomotive Div.) ... 177
Barber-Greene Co. ... 197
*Bemis Bros. Bag Co. ... 166
Bethlehem Steel Co. ... 44
Bin-Dicator Co. ... 192
*Birdsboro Steel Foundry & Machine Co. ... 157
*Bixby-Zimmer Engineering Co. ... 176
Booth Engineers ... 198
Boston Woven Hose & Rubber Co. ... 48, 49
*Boyles Bros. Drilling Co. ... 113
Bucyrus-Erie Co. ... 34
Builders-Providence, Inc. ... 196

*Card Iron Works Co., C. S. ... 182
Caterpillar Tractor Co. ... 107, 110, 206
Chemical Construction Co. ... 34A
*Chicago Pneumatic Tool Co. ... 10
*Christensen Diamond Products Co. ... 158
*Cleveland Rock Drill Div. of Le Roi Co. ... 26, 27
Cleveland Vibrator Co. ... 172
Cleveland Worm & Gear Co. ... 131
*Colorado Fuel & Iron Corp. ... 161
Columbia-Geneva Steel Div. ... 19, 35
*Connellsville Mfg. &Mine Supply Co. ... 178
*Coppus Engineering Corp. ... 151
*Crane Co. ... 12
Crucible Steel Co. of America ... 108

*Deister Concentrator Co. ... 136
*Denver Equipment Co. ... 46
*Differential Steel Car Co. ... 150
*Dings Magnetic Separator Co. ... 54
Dodge Mfg. Corp. ... 58
*Dorr Co. ... 103, 115
*Dow Chemical Co. ... 135
Duri-Werk Karl Kempf, K. G. ... 198

*Easton Car & Construction Co. ... 137
*Eimco Corp. ... 30, 31, 51, 63
Engineers Syndicate ... 172
*Ensign-Bickford Co. ... 50

Fairbanks, Morse & Co. ... 165
Fuller Co. ... 64

Galigher Co. ... 159
Gardner-Denver Co. ... 59
General Refractories Co. ... 167
Georgia Iron Works Co. ... 170
Godoy & Co., Inc., E. A. ... 150
*Goodman Mfg. Co. ... 33, 45
Goodrich Co., B. F. ... 5
Goodyear Tire & Rubber Co. ... 11
Gould-National Batteries, Inc. ... 171
Greensburg Machine Co. ... 166
*Grinnell Co., Inc. ... 153

Hammermills, Inc., Div. Pettibone Mulliken Corp. ... 138
Harbison-Walker Refractories Co. ... 144, 145
*Hardinge Co. ... 126, 127
Harnischfeger Corp. ... 143
Hayes Steel Products Ltd. ... 188
*Hazard Insulated Wire Works Div. Okonite Co. ... 189
Heil Co. ... 134
Hewitt-Robins, Inc. ... 20, 21
*Heyl & Patterson, Inc. ... 65
Hyster Co. ... 191

*Ingersoll-Rand Co. ... 3
International Harvester Co. ... 162

Jenkins Bros. ... 105
Johnson Co., C. A. ... 8, 9
Johnston Pump Co. ... 187
*Jones & Laughlin Steel Corp. ... 60
*Joy Mfg. Co. ... 16, 17, 47, 196

Kaiser Engineers Div. of Henry J. Kaiser Co. ... 111
*Kennedy-Van Saun Mfg. & Engrg. Corp. ... 123
Koehring Co. ... 8, 9

*Laughlin Co., Thomas ... 186
*Le Roi Co. ... 26, 27
*Le Tourneau-Westinghouse Co. ... 42, 43
*Link Belt Co. ... 192

Mack Trucks ... 193
*Mancha Storage Battery Locomotive Div. Goodman Mfg. Co. ... 33
Manhattan Rubber Div. ... 62
*Manitowoc Engineering Works ... 185
*McLanahan & Stone Corp. ... 179
*Merrick Scale Mfg. Co. ... 176
Mine & Smelter Supply Co. ... 117
Mt. Vernon-Woodberry Mills ... 173

*National Filter Media Corp. ... 128
*Naylor Pipe Co. ... 132
New York Air Brake Co. ... 141
New York Engineering Co. ... 196
Northwest Engineering Co. ... 15
Norton Co. ... 198

Parson Co. ... 8, 9
Pennsylvania Drilling Co. ... 192
Permutit Co. ... 149
Philadelphia Gear Works, Inc. ... 155
Precision Radiation Instruments ... 172
Pressed Steel Car Co., Inc. ... 140

Raybestos-Manhattan, Inc. ... 62
*Republic Rubber Div. ... 181
Research Corp. ... 130
Roebling Sons Corp., John A. Sub. Colorado Fuel & Iron Corp. ... 61
Ryerson & Sons, Inc., J. T. ... 182

*Sanford-Day Iron Works, Inc. ... 38, 39
Santa Fe Tank & Tower Co. ... 146
Sauerman Bros., Inc. ... 156
Searchlight Section ... 200-203
*Simplex Wire & Cable Corp. ... 24
Skookum Co., Inc. ... 178
*Smidth & Co., F. L. ... 199
Smit & Co., Anton ... 196
*Smit & Sons, Inc., J. K. ... 164
Smith Engineering Works ... 139
Spang & Co. ... 174
*Sprague & Henwood, Inc. ... 180
Standard Oil Co., of Calif. ... 40
*Stephens-Adamson Mfg. Co. ... 41
Stoody Co. ... 119
*Sturtevant Mill Co. ... 28
Superior-Lidgerwood-Mundy Corp. ... 154

*Tennessee Coal & Iron Div. ... 19, 35
Texas Co. ... 6, 7
*Thomas Flexible Coupling Co. ... 168
Thor Power Tool Co. ... 195
*Timken Roller Bearing Co. ... Fourth Cover, 13
*Tinney Drilling Co. ... 190
*Traylor Engineering & Mfg. Co. ... 53

United States Rubber Co. ... 169
United States Rubber Co. (Tire Div.) ... 124
*United States Steel Corp. ... 19, 35
*United States Steel Export Corp. ... 19, 35

Victaulic Co. of America ... 148
*Vulcan Iron Works ... 205

Walworth Co. ... 36
*Wedge Wire Corp. ... 176
Western Machinery Co. ... 133
Western Precipitation Corp. ... 147
Western Rock Bit Mfg. Co. ... 183
*Westinghouse Electric Corp. ... 22, 23
*Wheel Trueing Tool Co. ... 129
*Wickwire Spencer Steel Div. Colorado Fuel & Iron Corp. Insert between pp. 34, 35
*Wilfley & Sons Co., A. R. ... 66
Willson Products, Inc. ... 184

Yuba Mfg. Co. ... 170

PROFESSIONAL SERVICES ... 194

SEARCHLIGHT SECTION
(Classified Advertising)
H. E. Hilty, Mgr.

EMPLOYMENT
Positions Vacant ... 200
Positions Wanted ... 200
Selling Opportunities Wanted ... 200

BUSINESS OPPORTUNITIES
Offered ... 200

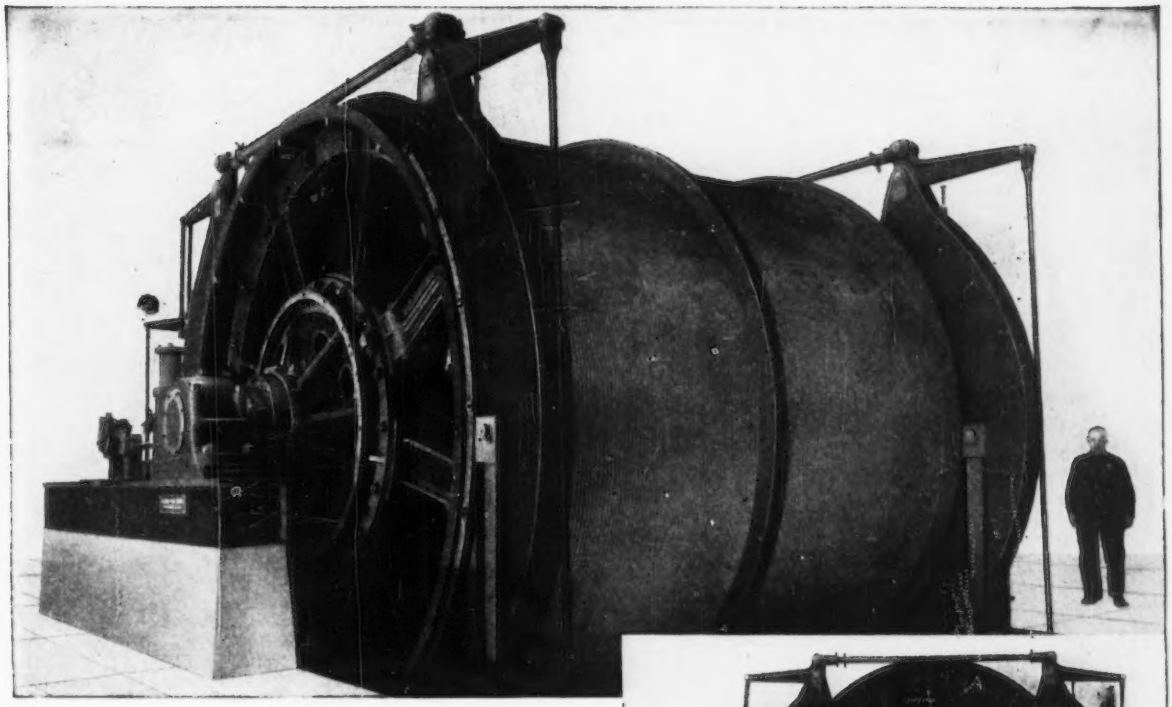
PROPERTY
For Sale ... 200
Wanted ... 200

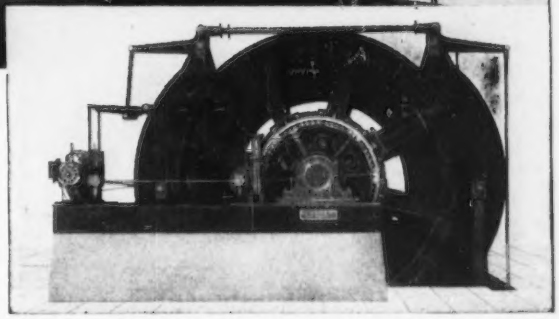
EQUIPMENT
(Used or Surplus New)
For Sale ... 200-203

WANTED
Equipment ... 200

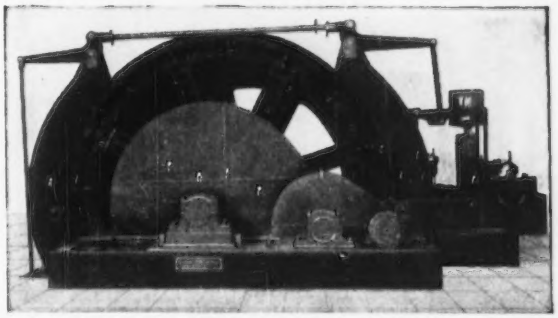
ADVERTISERS INDEX

Albert Pipe Supply Co., Inc. ... 201
American Air Compressor Corp. ... 202
Anglo American Corp. of So. Africa, Ltd. ... 200
Bohn Aluminum & Brass Corp. ... 202
Calumet & Hecla, Inc. ... 203
Carlyle Rubber Co. ... 203
Consolidated CopperMines Corp. ... 202
Cosmopolitan Sales Co. ... 200
Florence Machinery & Supply Co. ... 201
Goodman, Al. J. ... 202
Heineken, Inc., W. P. ... 201
Kirk Co., Wallace E. ... 203
Lefton Industrial Co. ... 202
Machinery Center, Inc. ... 202
Marine Electric Co. ... 202
Medical Salvage Co., Inc. ... 202
Morse Bros. Machinery Co. ... 201
O'Neill, A. J. ... 203
Remmert-Werner Inc. ... 202
Schoonmaker & Co., A. G. ... 202, 203
Smith Co., H. Y. ... 202
Smith, Paul F. ... 200
Stanhope, Inc., R. C. ... 203
Thurman, C. H. ... 200
Universal Wire & Cable Co. ... 202
Vulcan Detinning Co., The ... 203





Shop assembly, showing positive toothed-type clutch, oil-hydraulic clutch engine and, at extreme left, oil-hydraulic brake engine controlled by Lilly safety device. Heavy weights for applying the brakes will be located in pits below the floor level.



Shop assembly, showing oil-tight welded-steel casings for double-reduction herringbone gears, through which the hoist will be driven by a 500 hp. wound-rotor induction motor. Main shaft and both pinion shafts are mounted on self-aligning spherical roller bearings. Other modern features include a Trip Recorder, a Recording Tachometer and a Centralized-Control Desk on the floor level.

BIG . . . but still fast . . . safe . . . dependable

This huge electric mine hoist embodies every approved advantage for fast, safe, hoisting in a shaft 800 meters deep. Designed primarily for balanced hoisting of men and materials from several different levels, it will be used also, at times, for hoisting ore. Vulcan double-deck cages and "Allcasteel" sheaves were furnished for the same installation.

Each of the two all-steel built-up cylindrical drums is 18′-0″ in diam. by 8′-1″ in width with accurately-machined helical grooves for stowing approximately 2800 feet of 1½″ rope in one layer. The "loose" drum is equipped with a positive toothed-type clutch. Parallel-motion post-type brakes on each drum are equipped with pressure-graduating rigs and controlled by dependable safety devices which apply the brakes automatically in event of power-failure, overspeed or overtravel. Brakes and clutch are both operated by oil-hydraulic engines and, on the loose drum, are mechanically and electrically interlocked.

Other superior features, here illustrated and described, combine to assure the dependable trouble-free service that has made Vulcan hoists the standard of the mining world for more than a hundred years.

Correspondence is invited regarding any requirement for heavy-duty hoists, sheaves, cages, skips, etc. Illustrated bulletins mailed promptly on request.

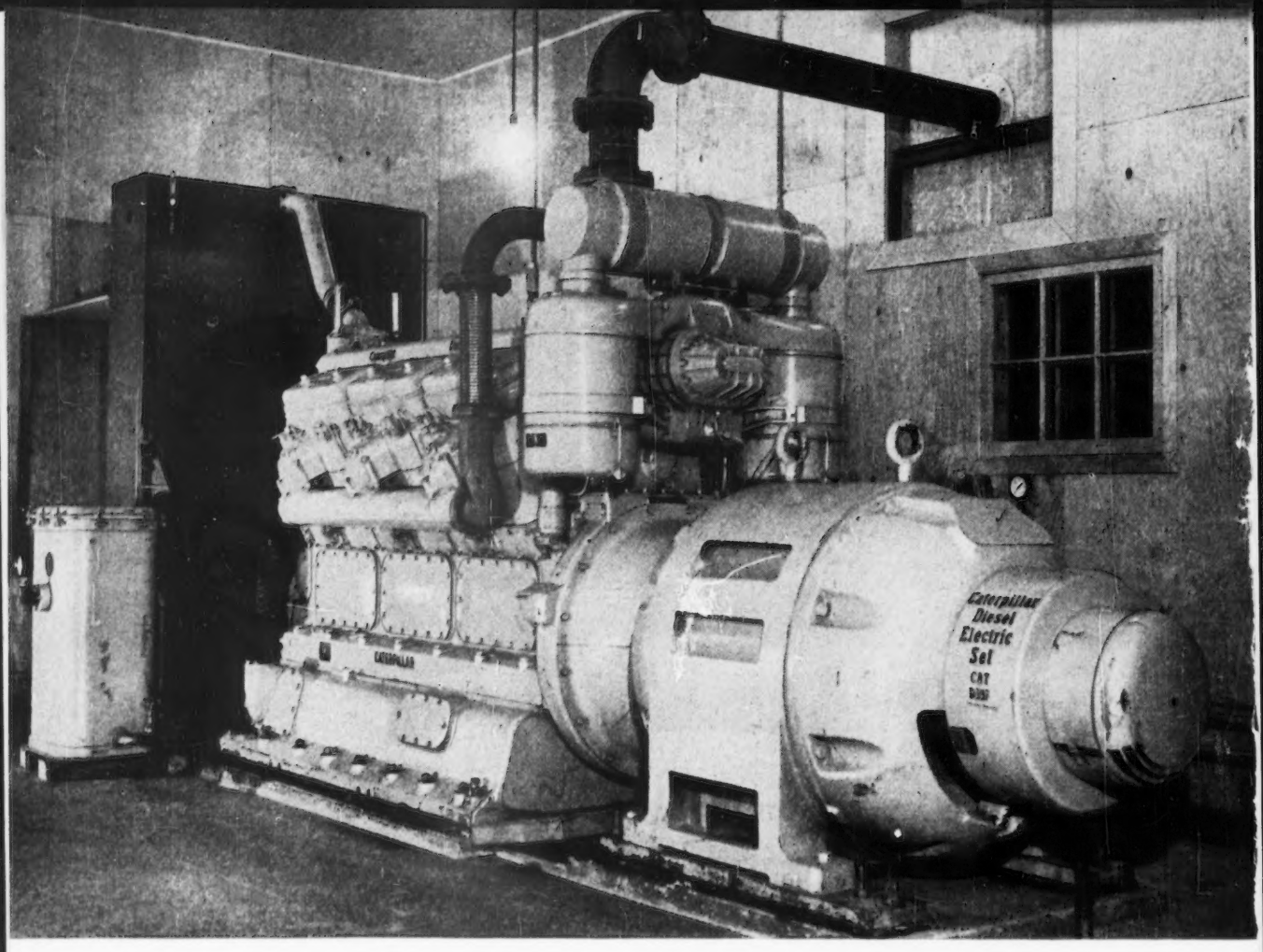
Vulcan Iron Works

Established 1849

WILKES-BARRE, PA., U.S.A.

New York City Office, 50 Church Street

DESIGNERS AND BUILDERS OF ELECTRIC HOISTS, "ALLCASTSTEEL" SHEAVES, CAGES, SKIPS, GUNBOATS, ETC., UNDERGROUND CONVEYORS AND ALL TYPES OF LOCOMOTIVES FOR BOTH UNDERGROUND AND SURFACE HAULAGE



THEY HAD TO BE SURE

AT SEVEN ISLANDS, QUEBEC...

they chose CAT* power

This Caterpillar D397 Electric Set has been selected to supply power to vital installations at the Seven Islands railway terminus of the Iron Ore Co. of Canada. A large volume of ore will start coming early next year over this 360-mile railway, built through fantastically difficult terrain to the rich ore deposits of the Ungava region. Cost of this mine development is more than $200,000,000.

This Cat Electric Set will generate 315 KW of 4160-volt, three-phase, 60-cycle current for the dock area, railroad yard, office, warehouses, base camp and overhaul shop. In a climate that varies from cool to bitter cold, it will run 24 hours a day, every day of the year!

Like many another mining operator, the Iron Ore Co. of Canada bought Caterpillar equipment to do an important job. They knew they could count on Cat Diesel Engines for many thousands of hours of pamper-free, low-maintenance power. And as an extra bonus, their Caterpillar Engines will deliver full, *honestly rated* horsepower on money-saving No. 2 furnace oil.

There's a Caterpillar Diesel Engine or Electric Set for *your* job—12 sizes to 500 HP or 315 KW. Your nearby Caterpillar Dealer, who offers fast, skilled service and a full stock of genuine factory parts, will gladly help you with your power requirements. Call him for the whole story—and ask him to give you on-the-job proof of engine performance.

Caterpillar Tractor Co., Peoria, Ill.

CATERPILLAR*

*Both Cat and Caterpillar are registered trademarks—®

WE'VE MADE CLAIMS... NOW MAKE US PROVE THEM

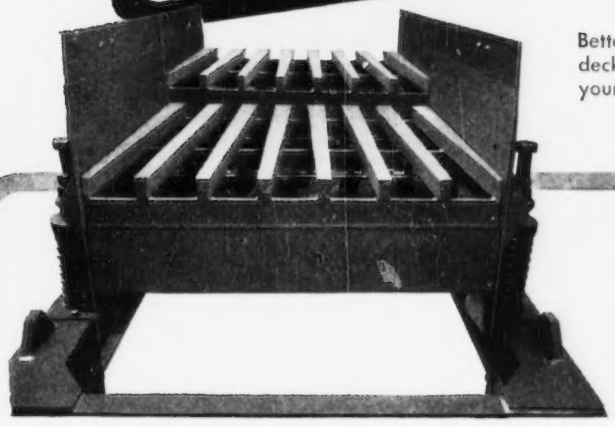
Special Decks for Primary Scalping

ALLIS-CHALMERS **Vibrating SCREENS**

Will Give You...

★ **MORE CAPACITY!**
★ **LESS PLUGGING!**
★ **LONGER LIFE!**

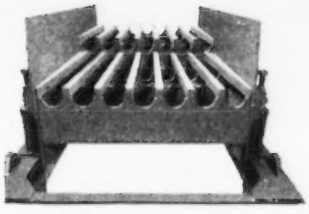
Better results in scalping with these special decks . . . designed to S-T-A-Y C-L-E-A-R on your heavy duty jobs.



Double Tapered Grizzly Bar Deck

(for openings 1 to 3 in.)

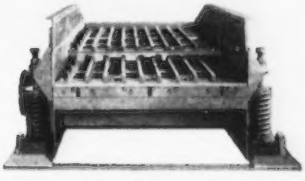
Longitudinal openings between grizzly bars stay clear because bars provide flared openings. Step deck turns material over, dumping fines from large pieces. Each bar is tapered from back to front and from top to bottom for additional freedom from plugging. Handles feed sizes up to 30 in. diameter.



Straight Grizzly Bar Deck

(for openings 4 to 10 in.)

For run-of-mine screen as shown above for use with straight instead of tapered grizzly bars. Openings between bars are flared from back to front for free material discharge. Handles feed in excess of 1000 tph in sizes up to 3 ft.



Steel Plate Deck with Skid Bars

(for openings 3 to 10 in.)

For run-of-mine scalping where positive scalping is desired. Steel plate decks with skid bars may be obtained with or without step deck construction. Plate deck is bolted to screen body and can be removed easily.

These special decks for primary scalping are available on both Style C and Extra Heavy Duty *Ripl-Flo* vibrating screens.

A-3938

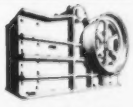
Ripl-Flo is an Allis-Chalmers trademark.

ALLIS-CHALMERS

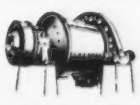
Sales Offices in Principal Cities in the U. S. A. Distributors Throughout the World.

Hammermills

Vibrating Screens


Jaw Crushers

Gyratory Crushers

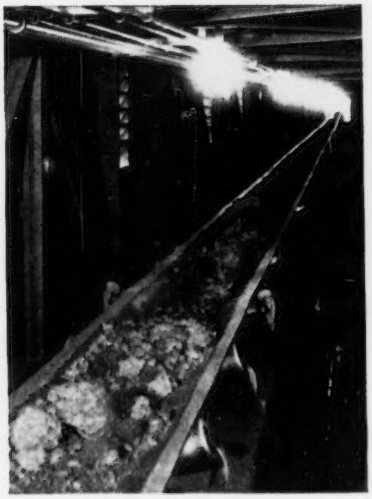

Grinding Mills

Kilns, Coolers, Dryers

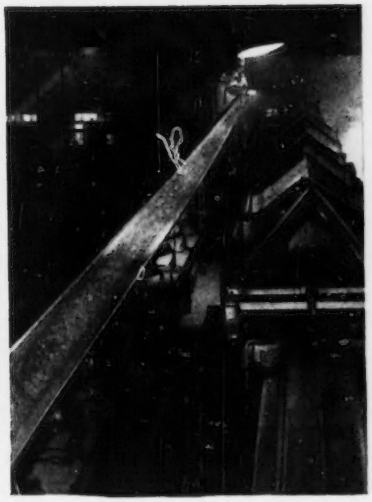
For long-lived, heavy-duty conveyors . . .

IT'S TIMKEN . . . AND TIMKEN . . .

This Pioneer Washing Plant handles an average of 70 yards of sand and gravel an hour. Conveyor idlers are equipped with Timken bearings—one reason why the plant still has the same conveyor belt after 5 years' operation!



Here's a 337-foot Bartlett and Snow conveyor carrying iron ore sinter at the rate of 150 tons an hour. Timken bearings on conveyor idlers reduce friction, assure long life, reduce belt wear.



Tempered moulding sand—50 tons of it an hour—rides at the speed of 125 feet a minute on this Rex Idler Installation in a foundry. Conveyor belt is 24 inches wide. Idlers are equipped with Timken bearings.

AND TIMKEN AGAIN!

AND HERE ARE 6 BIG REASONS WHY:

1. **THOROUGHLY PROVED.** The Timken® bearing is the only tapered roller bearing proved by 15 years or more of service in heavy-duty conveyor installations using the popular dead shaft construction.

2. **EXTRA CAPACITY.** Line contact between rollers and races gives Timken bearings high load capacity. And by using Timken bearing sizes that are mass produced for the automotive industry, you get extra capacity bearings that actually cost you *less* than the smaller sizes you'd normally use.

3. **LONG-LIFE LUBRICATION.** Nor just lubricated for "life", but lubricated yearly, or as conditions require, to insure *long* life. Fresh lubricant ends any chance of gummy, sticky, jammed bearings.

4. **LONGER ROLLER AND BELT LIFE.** Less sliding and scuffing between idlers and belt.

5. **FRICTION MINIMIZED.** Timken bearings' true rolling motion and extremely smooth surface finish practically eliminate friction.

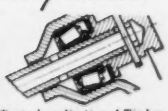
6. **MAINTENANCE REDUCED.** Long life and dependable performance of Timken tapered roller bearings cut maintenance to a minimum.

Remember "Timken" is not a bearing type. It is a trademark applying to bearings made by The Timken Roller Bearing Company. Always insist on Timken bearings in the conveyors you build or buy. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

Wherever the going's tough industry turns to

TIMKEN

TAPERED ROLLER BEARINGS



Typical application of Timken bearings for conveyor idlers.

NOT JUST A BALL ○ NOT JUST A ROLLER ⬭ THE TIMKEN TAPERED ROLLER ◫ BEARING TAKES RADIAL ◐ AND THRUST ◍ LOADS OR ANY COMBINATION